COMPAQ

ProLiant ML570 Server

Maintenance and Service Guide

Second Edition (March 2001)
Part Number 122821-002
Spare Part Number 174032-001
Compaq Computer Corporation

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About This Guide

This maintenance and service guide is designed to be used as a reference, spare parts catalog, troubleshooting, and step-by-step disassembly guide when servicing the Compaq *ProLiant*™ ML570 server.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

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Compaq Technician Notes

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repair specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs could create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: To properly ventilate the system, you must provide at least 30.5 cm (12 inches) of clearance at the front and back of the computer.

CAUTION: This unit is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded (earthed) AC outlet only.

IMPORTANT: Any indications of component replacement or printed wiring board modifications may void any warranty.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

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Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help as described in the following sections:

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 bours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside Nortb America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to tbe Internet:

http://www.compaq.com

Be sure to have tbe following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards and hardware names and revision level
- Third-party software names and revision level
- Operating system type and revision level

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can access tbe Compaq website by logging on to the Internet:

http://www.compaq.com

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq website for locations and telephone numbers.

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Chapter 1

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spare parts list for the Compaq *ProLiant*™ ML570 server. See Table 1-1, Table 1-2, and Table 1-3 for the names of referenced spare parts.

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Chassis Components Exploded View

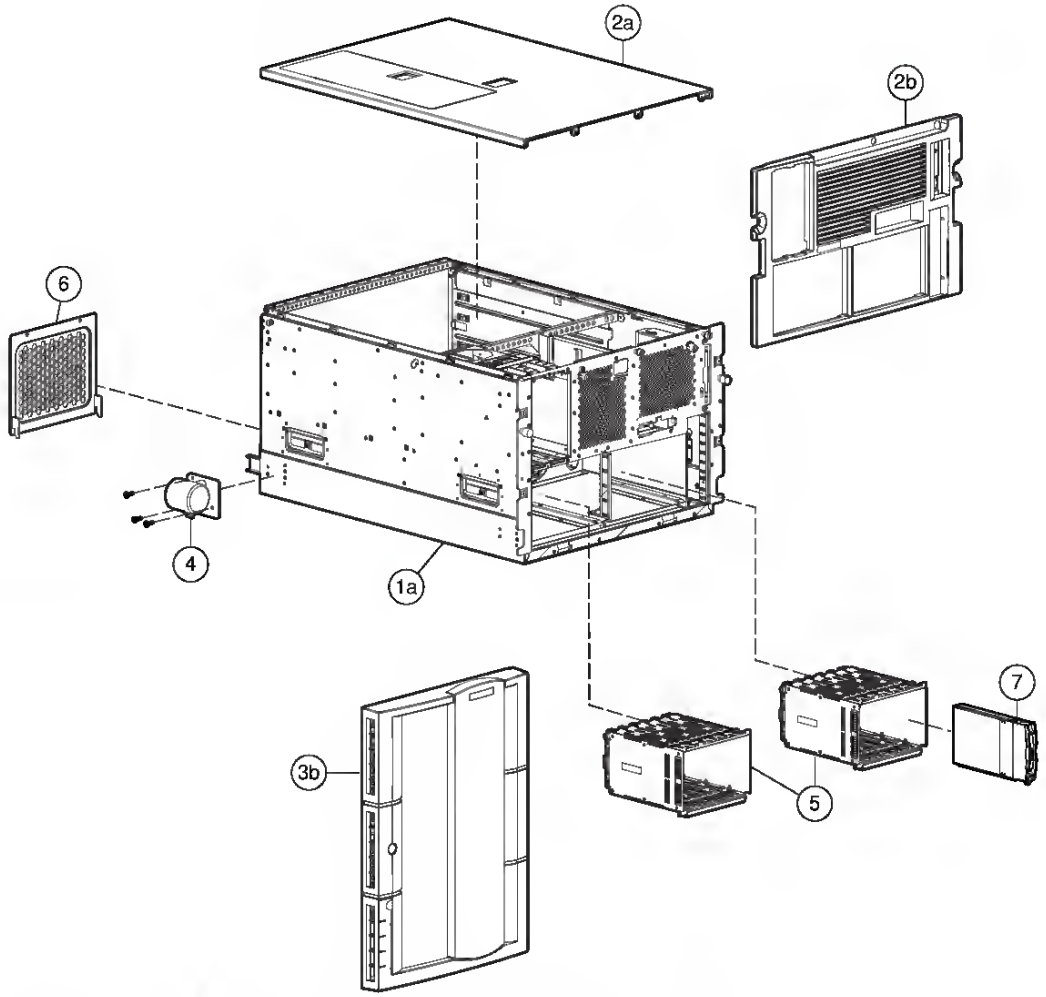

Figure 1-1. Exploded view of the ProLiant ML570 server chassis components (rack model)

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Chassis Components Spare Parts List

Table 1-1
Chassis Components Spare Parts List

Item	Description	Spare Part Number
1	Chassis	
	a) Rack	174570-001
	b) Tower *	174569-001
2	Cover kit (rack model)	175684-002
	a) Access panel	
	b) Rack-mount bezel plate	
3	Cover kit (tower model)	175684-001
	a) Access panel *	
	b) Front bezel door	
	c) Hood assembly *	
4	Locking casters	296227-001
5	SCSI hot-plug drive cage with 6-bay backplane board (2)	159313-001
6	Power supply blanking panel	159310-001
7	Hard drive blanking panel	122759-001

* Not shown

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System Components Exploded View

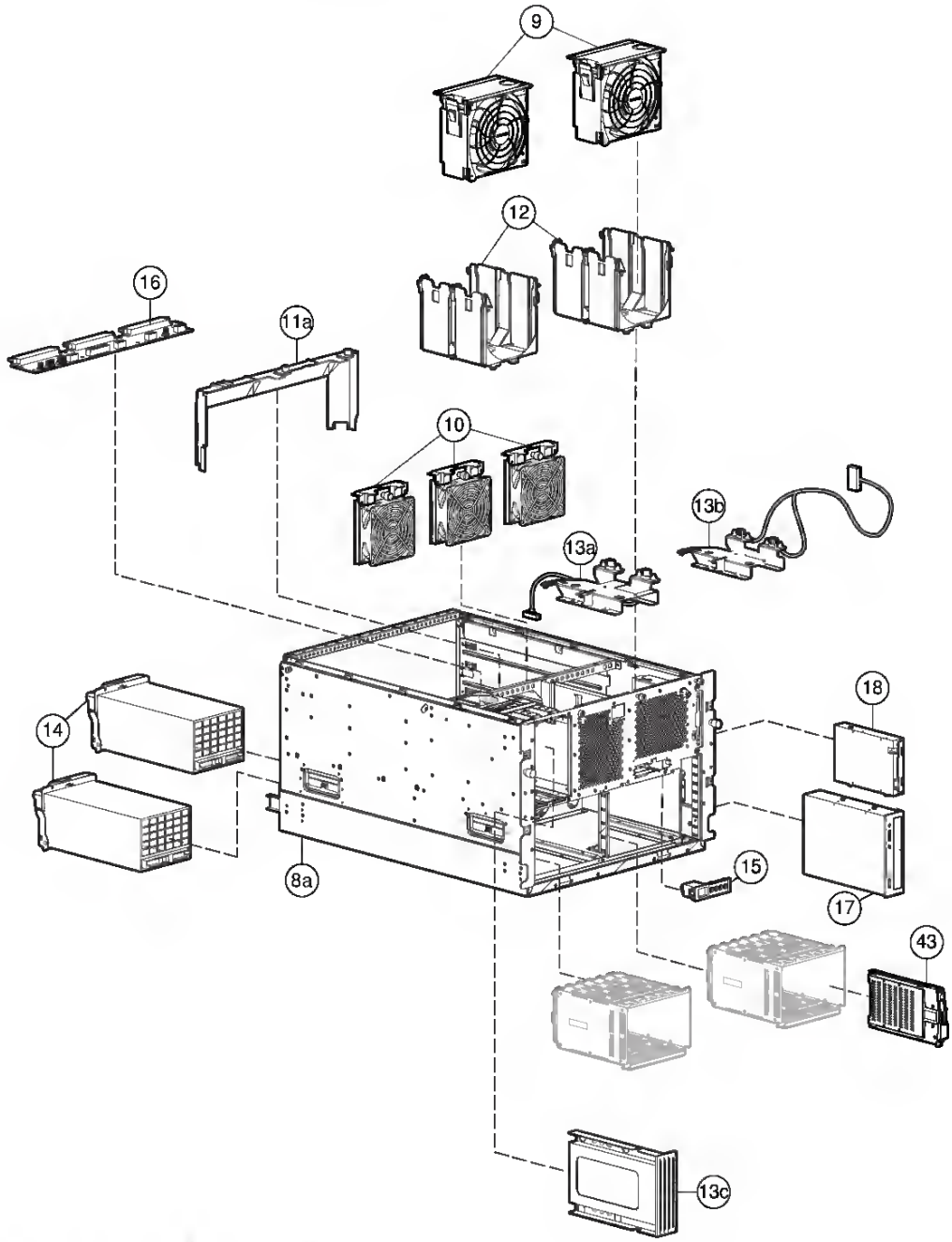

Figure 1-2. Exploded view of the ProLiant ML570 server system components

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System Components Spare Parts List

Table 1-2
System Components Spare Parts List

Item	Description	Spare Part Number
8	System chassis (same as item 1, Figure 1-1)	
	a) Rack	174570-001
	b) Tower *	174569-001
9	Hot-plug system fan (2)	122225-001
10	Hot-plug hard drive fan (3)	161657-001
11	Miscellaneous plastics kit	178195-001
	a) Hard drive fan air baffle	
	b) CPU fan air baffle (shown in Figure 1-3)	
	c) Expansion board slot release lever (port-colored and beach gray) *	
	d) PCI retainers *	
	e) Option board retainers *	
	f) Media locking latch (green) *	
12	System fan basket (2)	161658-001
13	Miscellaneous hardware kit	159321-001
	a) System fan basket adapter with cable (left)	
	b) System fan basket adapter with cable (right)	
	c) Removable media bay blanking panel	
14	Power supply, 450 watts, hot-plug (2)	157793-001
15	Power On/Standby switch with LED indicators	161659-001
	Boards	
16	Power supply backplane board, hot-plug	159314-001
	Mass Storage Devices	
17	CD-ROM drive	179963-001
18	1.44-MB diskette drive	123958-001

* Not shown

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Electronics Drawer System Components Exploded View

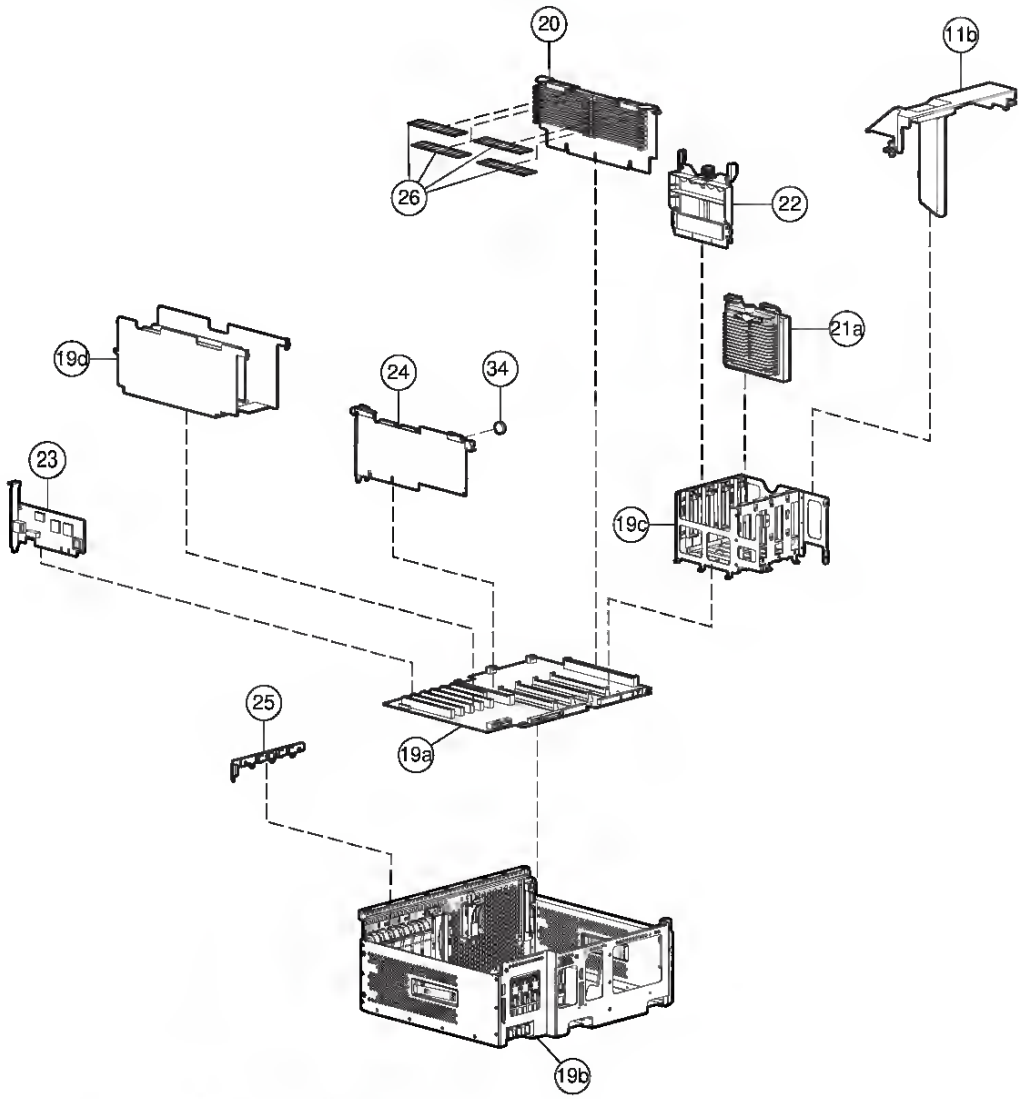

Figure 1-3. Exploded view of the ProLiant ML570 server electronics drawer system components

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Electronics Drawer System Components Spare Parts List

Table 1-3
Electronics Drawer System Components Spare Parts List

Item	Description	Spare Part Number
	Boards	
19	System board kit	168063-001
	a) System board	
	b) System board tray (electronics drawer)	
	c) Processor cage assembly	
	d) Insulator basket	
	e) PCI Hot Plug Switchboard with cable (see item 25) *	
	f) Screws, 6-32 x 0.312 inch (20) *	
	g) Screws, (T-15) 6-19 x 0.375 inch (3) *	
20	Memory board, 16-DIMM	168064-001
21	Processor with green-colored heatsink	
	a) 700-MHz with 1-MB cache	175292-001
	b) 700-MHz with 2-MB cache *	175293-001
	c) 900-MHz with 2-MB cache *	188594-001
22	Terminator board	329271-001
23	NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL)	174831-001
24	Peripheral board	101951-001
25	PCI Hot Plug LED switchboard	168066-001
	Memory	
26	128-MB DIMM (100-MHz SDRAM, 64-Megabit, CL-2)	146488-001
27	256-MB DIMM (100-MHz SDRAM, 128-Megabit, CL-2) *	146489-001
28	256-MB DIMM (100-MHz SDRAM, 64-Megabit, CL-2) *	170514-001
29	512-MB DIMM (100-MHz SDRAM, 128 Megabit, CL-2) *	170515-001
30	512-MB DIMM (100-MHz SDRAM, 256-Megabit, CL-2) *	170515-001
31	1-GB DIMM (100-MHz SDRAM, 256-Megabit, CL-2) *	170518-001

* Not shown

continued

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Table 1-3
Electronics Drawer System Components Spare Parts List *continued*

Item	Description	Spare Part Number
	Cable Kits	
32	Miscellaneous signal cable kit *	180305-001
	a) 34-pin power data cable assembly	
	b) CD-ROM 40 pin data cable assembly	
	c) 34-pin diskette drive data cable assembly	
	d) Blue SCSI cable assembly	
	e) Yellow SCSI cable assembly	
	f) Internal/external VHDCI cable assembly	
	g) 2-drop SCSI cable assembly	
	h) PCI cable assembly, hot-plug	
33	Miscellaneous power cable kit *	159319-001
	a) 10-pin power cable assembly	
	b) 12-pin power cable assembly	
	c) CD-ROM/diskette drive power cable assembly	
	d) SCSI drive power cable assembly	
	e) LVD power cable assembly	
	Miscellaneous	
34	3-V lithium replacement battery	179322-001
35	Enhanced keyboard *	386209-001
36	Country kit, rack and tower *	174794-001
37	Return kit, rack *	174795-001
38	Return kit, tower *	174796-001
39	Carton and buns (international), rack *	174797-001
40	Carton and buns (international), tower *	174798-001
41	Tower-to-rack conversion kit *	159317-001
42	Maintenance and service guide *	174032-001

* Not shown

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Table 1-3
Electronics Drawer System Components Spare Parts List *continued*

Item	Description	Spare Part Number
	Options	
43	9.1-GB hot-plug Wide-Ultra3 SCSI hard drive with tray (10,000 rpm, 1-inch) (shown in Figure 1-2)	152188-001
44	9.1-GB hot-plug Wide-Ultra2 SCSI hard drive with tray (7,200 rpm, 1-inch) *	104665-001
45	9.1-GB hot-plug Wide-Ultra2 SCSI hard drive with tray (10,000 rpm, 1-inch) *	386536-001
46	18.2-GB hot-plug Wide-Ultra2 SCSI hard drive with tray (7,200 rpm, 1-inch) *	104663-001
47	18.2-GB hot-plug Wide-Ultra2 SCSI hard drive with tray (10,000 rpm, 1-inch) *	143920-001
48	18.2-GB hot-plug Wide-Ultra3 SCSI hard drive with tray (10,000 rpm, 1-inch) *	152190-001
49	9.1-GB hot-plug Wide-Ultra3 hard drive (15,000 rpm, 1-inch) *	189393-001
50	18.2-GB hot-plug Wide-Ultra3 hard drive (15,000 rpm, 1-inch) *	189395-001
51	36.4-GB hot-plug Wide-Ultra3 hard drive (10,000 rpm, 1-inch) *	177986-001
52	SCSI cable, internal/external *	159318-001
53	12-inch AC power cord, 250-V*	188493-002

* Not shown

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Chapter 2

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the Compaq ProLiant ML570 server. After completing all necessary removal and replacement procedures, run the Diagnostics program to verify that all components operate properly.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe all warnings and cautions throughout the "Removal and Replacement Procedures" instructions.

WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power devices should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

To service the ProLiant ML570 server, the following tools are recommended:

- Torx T-15 screwdriver
- Torx T-10 screwdriver
- Phillips screwdriver
- Nut driver
- From the Compaq SmartStart and Support Software CD:
  - System Configuration Utility
  - Drive Array Advanced Diagnostics
  - Diagnostics

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Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Make sure you are properly grounded (earthed) when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives PCB assembly-side down.
- Use nonconductive field service tools.

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Symbols on Equipment

These symbols may be located on equipment in areas where hazardous conditions may exist.

This symbol in conjunction with any of the following symbols indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a Network Interface Connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

These symbols on power supplies or systems indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Weight kg

Weight lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

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Preparation Procedures

The system power in the ProLiant ML570 server does not completely power down with the front panel Power On/Standby switch. The switch toggles between On and Standby, rather than On and Off. The Standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active. To completely remove all power from the system, you must disconnect all power cords from the server. For more information about removing power from the system, see "Powering Down the Server" later in this chapter. See "Server Warnings and Precautions" later in this chapter for further safety information.

IMPORTANT: Before beginning to remove any serviceable part, determine whether the part is hot-pluggable or non-hot-pluggable. Hot-pluggable devices in the ProLiant ML570 server include SCSI hard drives, fans, and power supplies.

Hot-Pluggable Parts

If the part is hot-pluggable, do not perform a power shutdown of the server. The access panel can be removed without causing system shutdown. Hot-pluggable devices in the ProLiant ML570 server includes Wide Ultra2 and Ultra3 SCSI hard drives, some expansion boards, fans, and power supplies.

IMPORTANT: It is not necessary to power down the server to replace hot-pluggable devices such as power supplies, fans, or PCI Hot Plug boards when they are not in active use.

Non-Hot-Pluggable Parts

If the part is non-bot-pluggable, the server must be shut down. Non-bot-pluggable parts include the processors, some expansion boards, DIMMs, and drive cages. See "Powering Down the Server" later in this chapter for complete powering down instructions.

WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-pluggable power devices should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

WARNING: To reduce the risk of personal injury or damage to the equipment when moving the server, be sure that:

- The access panel is securely fastened to the chassis.
- You do not use the electronics drawer handle to move the unit.
- You do not use the rack-mount bezel handles to move the unit.

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Powering Down the Server

Before beginning any of the removal and replacement procedures for non-hot-pluggable devices:

1. Press the Power On/Standby switch. This switch places the server in standby mode that disables the main power supply output and provides only auxiliary power (+5V) to the server.
2. Verify that the Power On/Standby switch power LED indicator is amber and that the fans are off.
3. Disconnect all AC power cords from the AC outlets, and then disconnect from the server.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

4. Disconnect all external peripheral devices from the server.

62 kg
137 lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

IMPORTANT: It is not necessary to power down the server to replace hot-pluggable components such as power supplies, CPU and I/O fans, or PCI Hot Plug boards when they are not in active use.

NOTE: It is necessary to be knowledgeable of electrostatic discharge information before performing the preparation procedures. For electrostatic discharge information, see "Electrostatic Discharge Information" earlier in this chapter

5. Position the server as follows to ensure stability and safety:
   - If the server is mounted in a rack, remove the server from the rack and place it on a sturdy table or workbench. To reduce the risk of personal injury or damage to the equipment, see "Rack Warnings" later in this chapter. Refer to the *Compaq ProLiant ML570 Server Setup and Installation Guide* for further information on working with racks.
   - If the server is a tower model, either lock the casters for stability when removing the access panel, or place the server on its side with the access panel up.

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Rack Warnings

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
- You are careful when pressing the component rail release latches and sliding the component into the rack. The slide rails could pinch your fingertips.
- You load the rack from the bottom up and load the heaviest item into the rack first.
- You do not attempt to move equipment racks without adequate assistance due to their height and weight.
- You do not attempt to move an equipment rack on an incline that is greater than 10 degrees from horizontal.
- You do not attempt to move a fully loaded equipment rack. Remove equipment from the rack before moving the rack.

Server Warnings and Precautions

WARNING: To reduce the risk of personal injury or damage to the equipment:

- The ProLiant ML570 server weighs at least 62 kilograms (137 pounds) when fully assembled.
- Observe local health and safety requirements and guidelines for manual material handling.
- Obtain adequate assistance to lift and stabilize the product during installation or removal.
- Remove all pluggable power supplies and modules to reduce the weight of the product.
- Make sure that the product is properly mated with the rails. Products that are improperly mated with the rails may be unstable.

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WARNING: To reduce the risk of electric shock or damage to the equipment:

- The installation of internal options and routine maintenance and service of this product should be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy levels.
- Allow the product to cool before removing covers and touching internal components.
- Do not use conductive tools that could bridge live parts.
- Remove all watches, rings, or loose jewelry when working in hot-plug areas of an energized server.
- Understand the hot-plug access panel provides access to hazardous energy circuits.
- Understand the panel should remain locked during normal operation.

  -Or-

  Install the server in a controlled access location where only qualified personnel have access to the server.
- Power down the equipment and disconnect all AC power cords before removing any access covers for non-hot-pluggable areas.
- Do not replace non-hot-pluggable components while power is applied to the product. First, shut down the product and disconnect all AC power cords.
- Do not exceed the level of repair specified in the procedures in the product documentation. All troubleshooting and repair procedures are detailed to allow only subassembly or module-level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.
- Verify that the AC power supply branch circuit that provides power to the rack is not overloaded. Maintaining a low electric current draw reduces the risk of personal injury, fire, or damage to the equipment. The total rack load should not exceed 80 percent of the branch circuit rating. Consult the electrical authority having jurisdiction over your facility for wiring and installation requirements.
- Do not pull on a cord or cable. When unplugging from the electrical outlet, grasp the cord by the plug.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: The ProLiant ML570 server must always operate with the system unit covers and air baffles in place. Proper cooling cannot be achieved if the system unit covers or air baffles are removed for extended periods.

IMPORTANT: The installation of options and servicing of this product must be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

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Locking Casters

To remove the locking casters:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Place the server on its side, then remove the three T-25 screws securing each caster to the chassis.
3. Pull the locking casters away from the server.

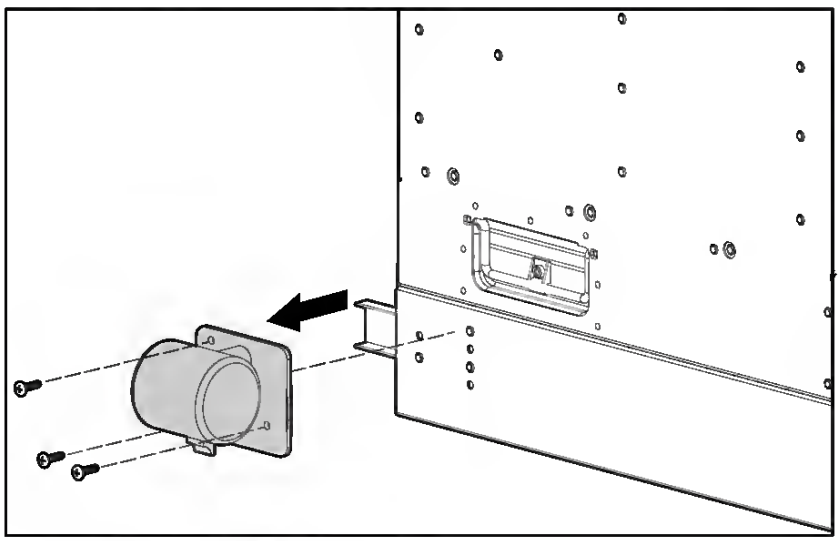

Figure 2-1. Removing the locking casters

Reverse steps 1 through 3 to replace the locking casters.

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Front Bezel Door (Tower Model Only)

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before handling the components.

To remove the front bezel door:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Swing open the front bezel door approximately 45 degrees.
3. Lift the front bezel door ❶ up, then pull it away from the chassis hinges ❷.

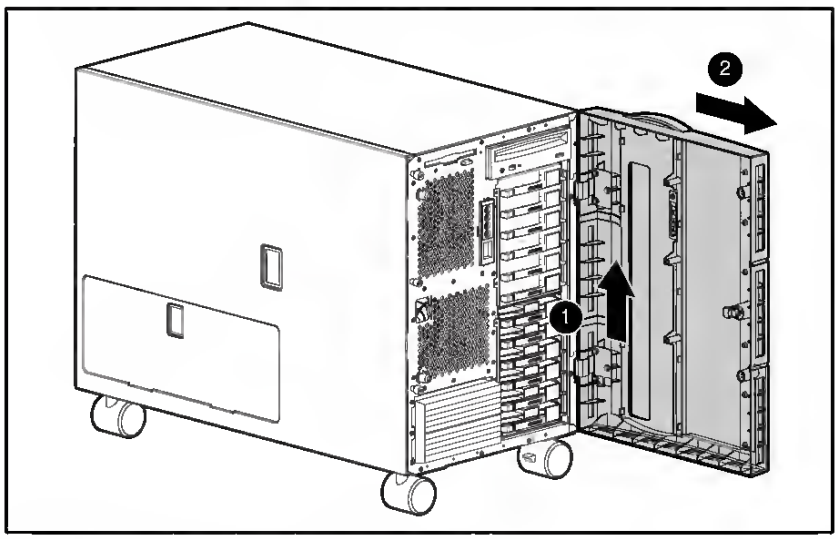

Figure 2-2. Removing the front bezel door (tower model only)

Reverse steps 1 through 3 to replace the front bezel door.

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Access Panel (Tower and Rack)

To remove the access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Open the front bezel door (tower model only). See "Front Bezel Door (Tower Model Only)" earlier in this chapter.
3. Loosen the two T-15 thumbscrews ❶ on the front of the chassis.
4. Remove the T-15 security screw ❷ located on the front of the chassis, next to the two thumbscrews.
5. Slide the access panel ❸ toward the back of the server, then lift it away from the chassis.

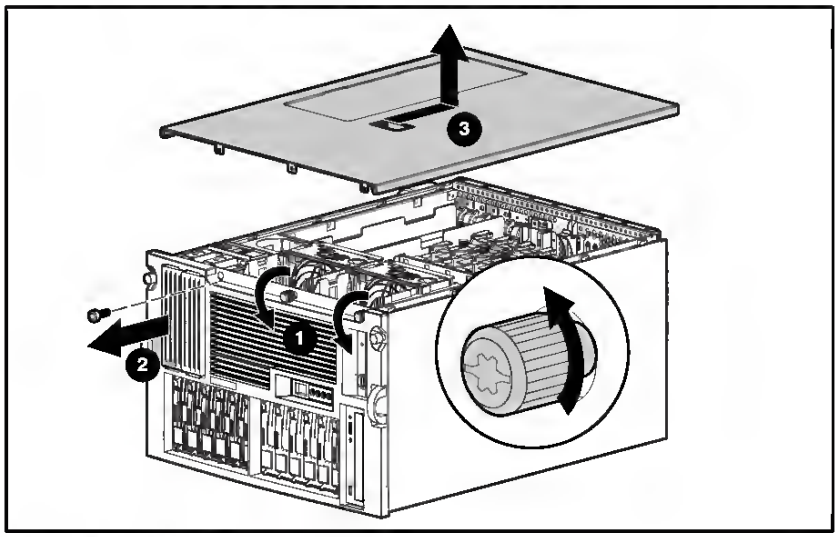

Figure 2-3. Removing the access panel

Reverse steps 1 through 5 to replace the access panel.

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Rack-Mount Bezel (Rack Model Only)

The rack-mount bezel must be removed to replace the power switch. To remove the rack-mount bezel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the four T-15 screws ❶ securing the rack-mount bezel to the chassis.
4. Pull the rack-mount bezel ❷ away from the chassis.

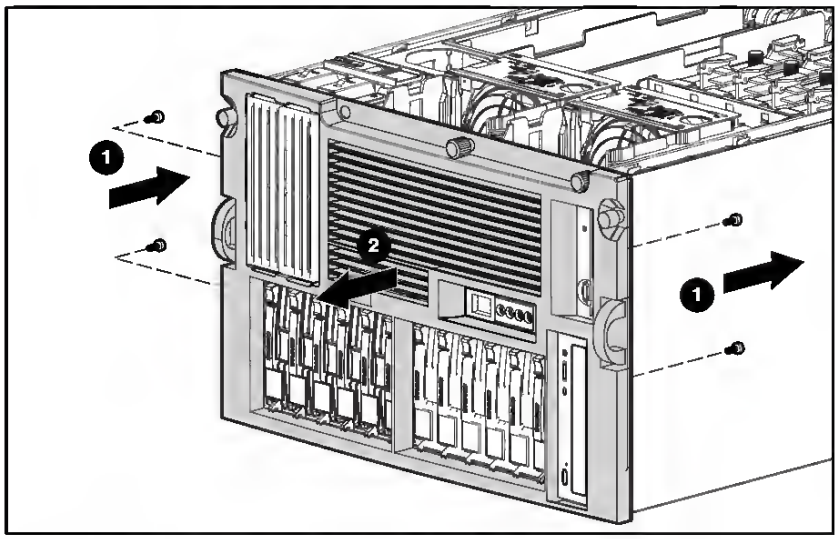

Figure 2-4. Removing the rack-mount bezel (rack model only)

Reverse steps 1 through 4 to replace the rack-mount bezel.

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CPU Fan Air Baffle

To remove the CPU fan air baffle:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Pull the two plastic pins ❶ located on the sides of the baffle that secure the fan baffle to the chassis.
4. Lift the CPU fan air baffle ❷ from the chassis.

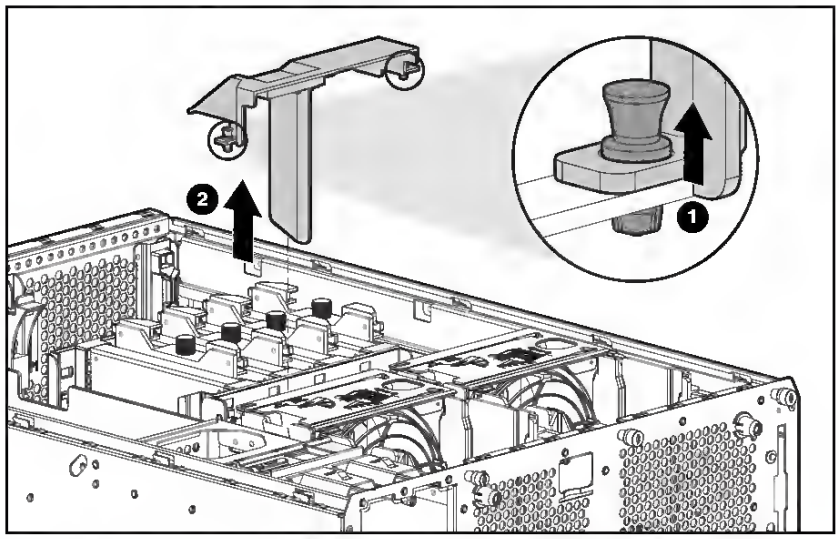

Figure 2-5. Removing the CPU fan air baffle

Reverse steps 1 through 4 to replace the CPU fan air baffle.

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Fans

The ProLiant ML570 server ships standard with two hot-plug system fans (one CPU and one I/O) and three redundant, hot-plug drive fans. The two system fan baskets are designed to allow for a redundant hot-plug fan in each basket. Figure 2-6 and Table 2-1 show the location of all fans in the ProLiant ML570 server, including the fan name and primary function.

NOTE: Fans may continue to spin after a temporary failure occurs. Replace failed fans (amber LED) even if spinning continues.

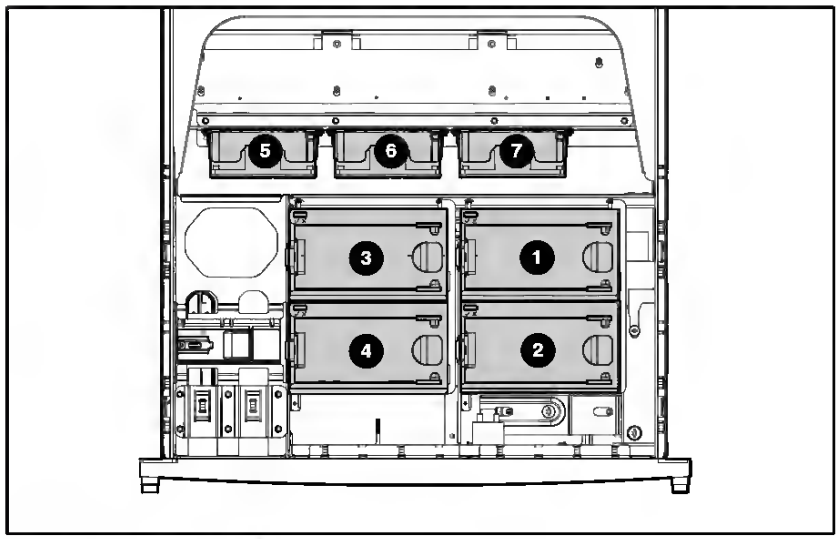

Figure 2-6. Hot-plug fan locations

Table 2-1
Hot-Plug Fan Locations

Fan	Name	Primary Function	Area Cooled
❶	Hot-plug system fan	Primary CPU fan	Processors
❷	Hot-plug system fan	Redundant CPU fan	Processors
❸	Hot-plug system fan	Primary I/O fan	System board
❹	Hot-plug system fan	Redundant I/O fan	System board
❺, ❻, ❼	Hot-plug hard drive fan	Drive fans	Hard drives

Note: An amber fan LED indicates fan failure. A green fan LED indicates that the fan is working properly. See "Hot-Plug Fan LED Indicators" in Chapter 4 for more information.

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Hot-Plug System Fans

The ProLiant ML570 server fans are housed in two system fan baskets. Each basket bolds a primary and a redundant hot-plug system fan. The hot-plug system fans cool the system board components (I/O fans) and the processors (CPU fans).

CAUTION: Never remove BOTH fans from the system fan baskets while the server is powered up. Overheating and damage to hardware could result. If the appropriate Compaq software drivers are installed, the operating system software initiates a power shutdown in case of overheating.

To remove a hot-plug system fan:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Press and hold the locking latches ❶, then lift the hot-plug system fan ❷ out of the system fan basket.

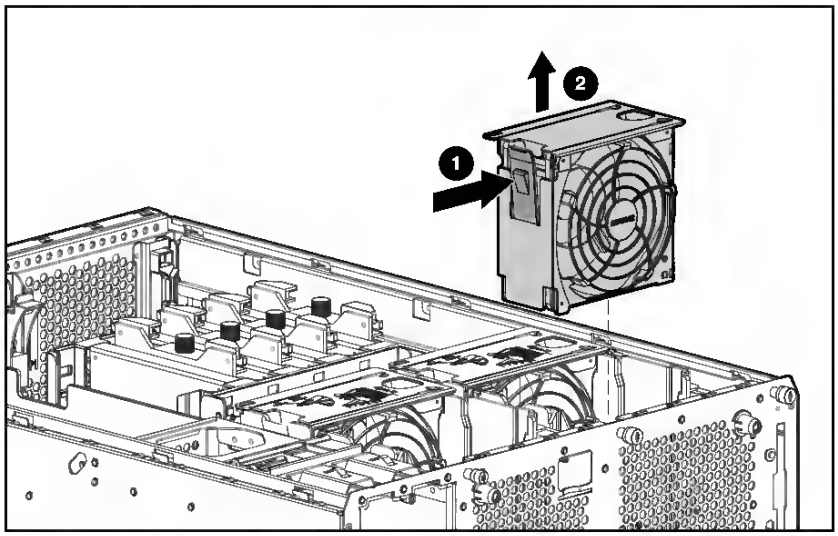

Figure 2-7. Removing a hot-plug system fan

Reverse steps 1 through 3 to replace a hot-plug system fan.

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System Fan Basket

The system fan basket houses the system fans.

WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power devices should be performed only by individuals who are qualified to service computer equipment and trained to deal with products capable of producing hazardous energy levels.

CAUTION: To maintain proper cooling, both fans must be operational.

CAUTION: Never remove both hot-plug fans from one system fan basket while the server is powered up. Overheating and damage to hardware could result. If the appropriate Compaq software drivers are installed, the operating system software initiates a power shutdown in case of overheating.

To remove the system fan basket:

1. Perform the preparation procedures. See "Powering Down the Server" earlier in this chapter.
2. Remove the hot-plug system fans. See "Hot-Plug System Fans" earlier in this chapter.
3. Loosen the T-15 thumbscrew ❶ that secures the system fan basket to the chassis.
4. Remove the system fan basket ❷ from the chassis.

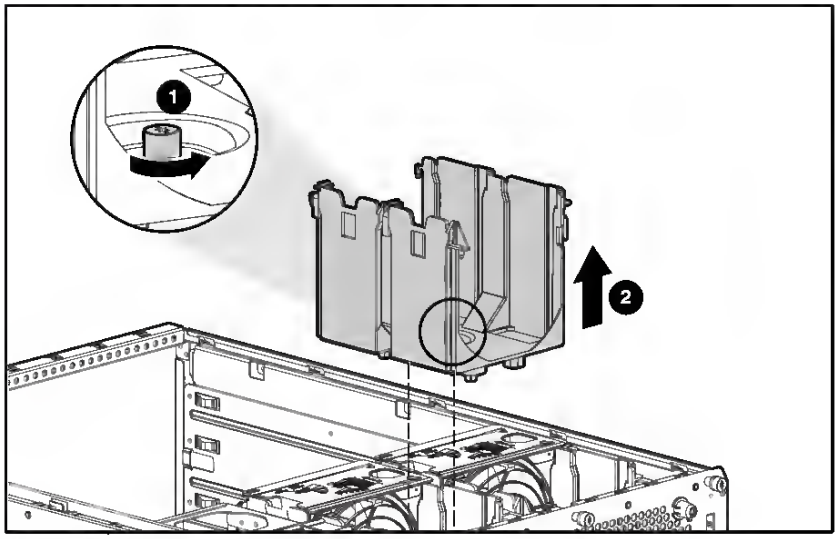

Figure 2-8. Removing the system fan basket

Reverse steps 1 through 4 to replace the system fan basket.

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System Fan Basket Adapter with Cable

To remove the system fan basket adapter with cable:

1. Remove the system fan basket. See "System Fan Basket" earlier in this chapter.
2. Remove the four T-15 screws ❶ securing the system fan basket adapter to the chassis.
3. Slide the adapter ❷ toward the center of the chassis, then lift the adapter out of the chassis.

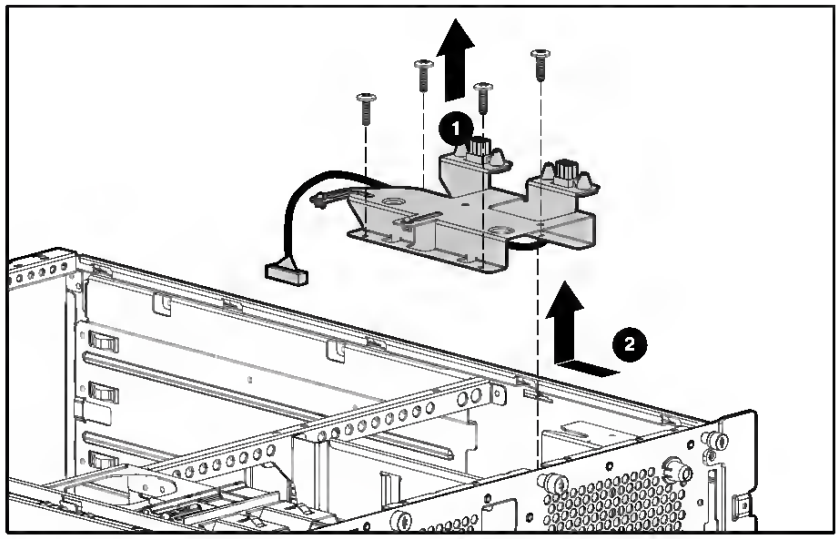

Figure 2-9. Removing the system fan basket adapter with cable

Reverse steps 1 through 3 to replace the system fan basket adapter with cable.

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Hot-Plug Hard Drive Fans

The ProLiant ML570 server ships standard with three hot-plug hard drive fans. Two fans are required for operation, and the third fan serves as a backup.

IMPORTANT: It is not necessary to power down the server to replace hot-plug devices such as power supplies, fans, or hard drives when they are not in active use.

To remove a hot-plug hard drive fan:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the hard drive fan air baffle. See "Hard Drive Fan Air Baffle" later in this chapter.
4. Using the electronics drawer handle, pull the drawer partially out of the chassis to access the hot-plug hard drive fans.

CAUTION: Hot-plug hard drive fans are located below all server cabling. Be careful not to unplug or loosen cables when accessing hot-plug hard drive fans.

5. Loosen the T-15 thumbscrew ❶ located at the top of the fan.
6. Lift the hot-plug bard drive fan ❷ out of the cbassis.

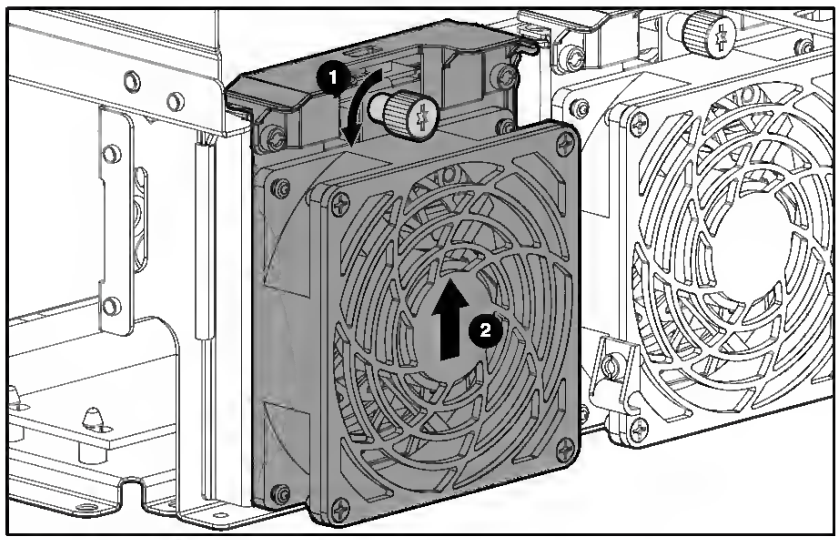

Figure 2-10. Removing a hot-plug drive fan

Reverse steps 1 througb 6 to replace a bot-plug hard drive fan.

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Hard Drive Fan Cable and Cable Bracket

WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power devices should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

To remove the hard drive fan cable and cable bracket:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the hot-plug drive fans. See "Hot-Plug Hard Drive Fans" earlier in this chapter.
3. Remove the hard drive fan air baffle. See "Hard Drive Fan Air Baffle" later in this chapter.
4. Remove the T-10 screw ❶ holding the hard drive fan cable bracket in place, then lift the hard drive fan cable bracket from the chassis.
5. Unplug the hard drive fan cable ❷ from the power backplane board.
6. Remove the hard drive fan cable from the unit.

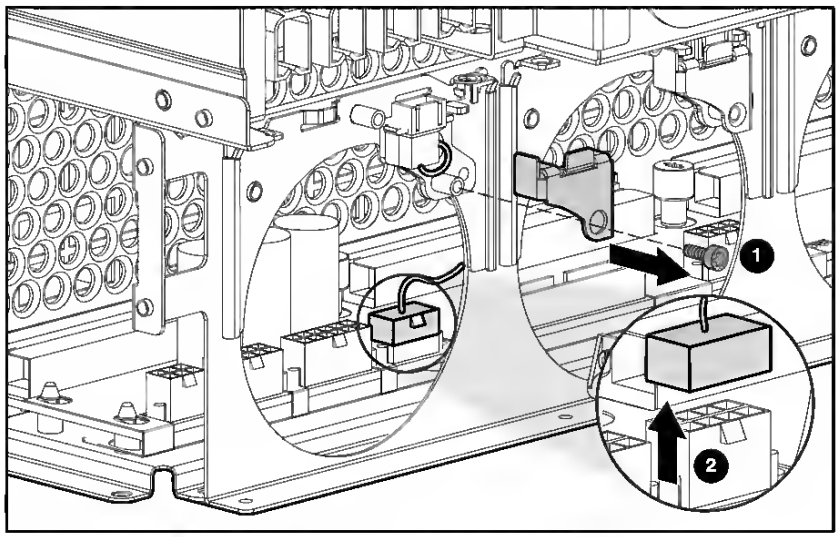

Figure 2-11. Removing the hard drive fan cable and cable bracket

Reverse steps 1 through 6 to replace the hard drive fan cable and cable bracket.

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Hard Drive Fan Air Baffle

To remove the hard drive fan air baffle:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove both system fan baskets. See "System Fan Basket" earlier in this chapter.
4. Slide the electronics drawer partially out of the chassis. See "Electronics Drawer" later in this chapter.
5. Loosen the two thumbscrews ❶ on the hard drive fan air baffle.
6. Slide the baffle ❷ over the drive fans, then lift the hard drive fan air baffle away from the chassis.

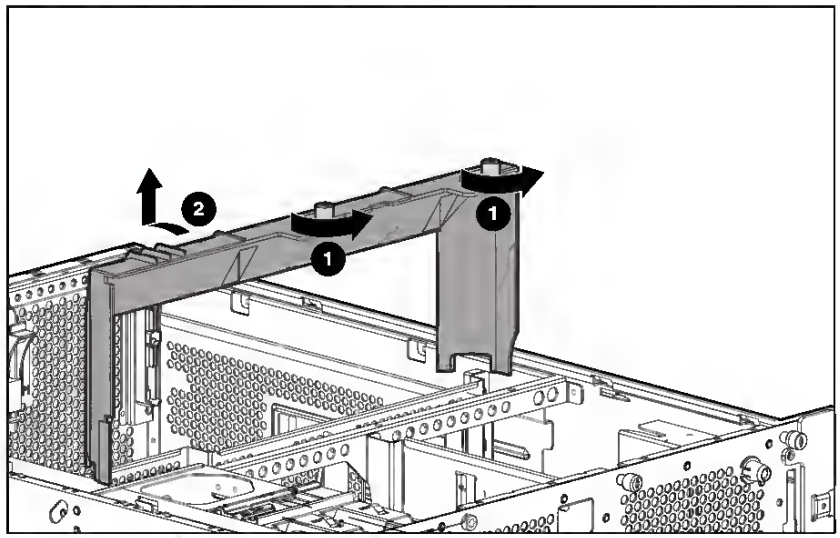

Figure 2-12. Removing the hard drive fan air baffle

Reverse steps 1 through 6 to replace the hard drive fan air baffle.

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Removable Media Area and Mass Storage Devices

The removable media area on the ProLiant ML570 server can house up to 16 mass storage devices. Figure 2-13 shows the location of all removable media and mass storage devices available on the ProLiant ML570 server. The removable media area consists of the following:

- Preinstalled 3.5-inch, 1.44-MB diskette drive
- Preinstalled IDE CD-ROM drive
- Two full-size removable media device bays
- Two hot-plug drive cages containing twelve 1-inch Ultra2 or Ultra3 hot-plug hard drives—six hard drives each on two SCSI buses

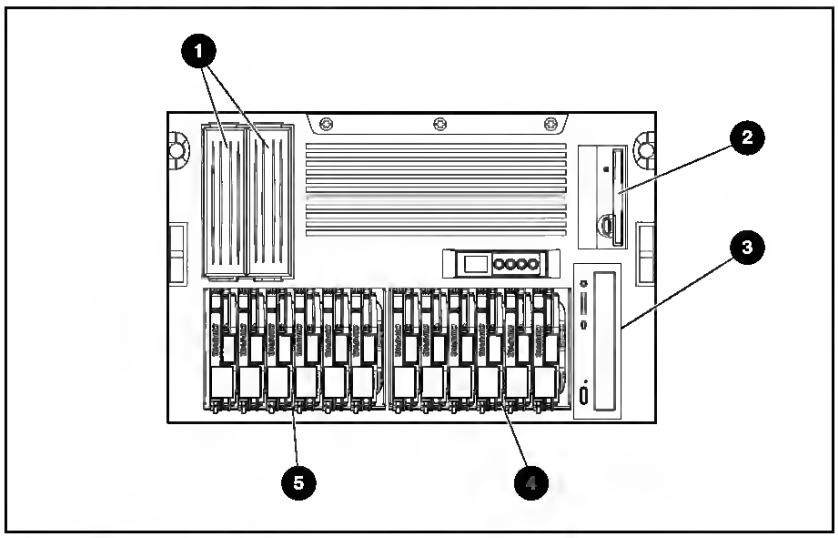

Figure 2-13. Removable media area and mass storage device locations

Table 2-2
Removable Media Area and Mass Storage Device Descriptions

Location	Description
❶	Removable media device bays
❷	Diskette drive
❸	CD-ROM drive
❹	Primary hard drive cage for hot-plug SCSI hard drives
❺	Secondary hard drive cage for hot-plug SCSI hard drives

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SCSI Hard Drive Blanking Panel

To remove a SCSI bard drive blanking blank:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Open the front bezel doors if the unit is a tower model. See "Front Bezel Door (Tower Model Only)" earlier in this chapter.
3. Push tbe sliding release button ❶ to unlock the blanking panel.
4. Pull the bard drive blanking panel ❷ out from the drive cage.

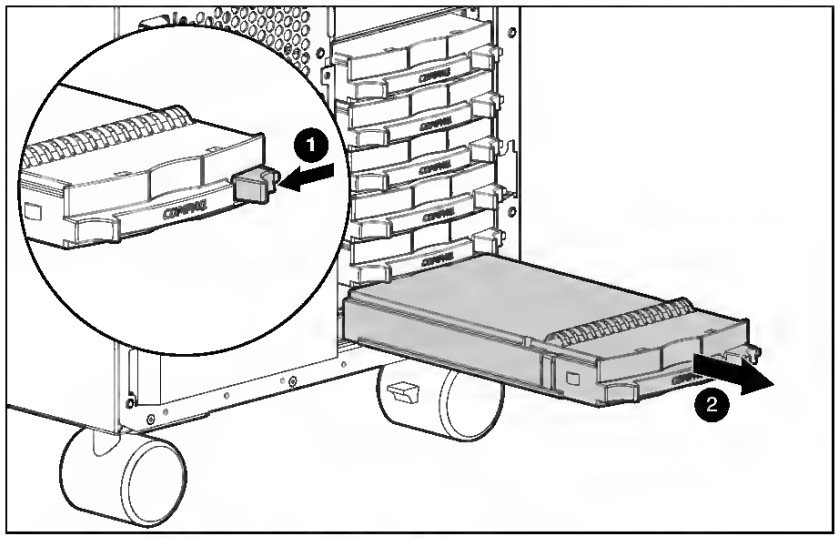

Figure 2-14. Removing the SCSI hard drive blanking panel

Reverse steps 1 through 4 to replace a SCSI hard drive blanking panel.

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Hot-Plug Hard Drives

The following guidelines are to he noted when removing and replacing hot-plug hard drives:

- Never remove a hot-plug hard drive if the LED icon is green. If several drives are used, the system boot drive should be installed in the lowest-numbered bay.
- Never remove more than one hard drive at a time. If the server is set in an array configuration, and a hard drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one hard drive is removed, a complete data set is not available to reconstruct data on the replacement drive(s).
- Never remove a working hard drive when another drive has been marked as failed by the controller. Permanent data loss occurs. Hard drives that have been failed by the controller are indicated hy the amber drive failure LED icon on the drive tray.
- Never remove a drive while another drive is heing rebuilt. A drive online LED icon flashes green when it is heing rebuilt. A replaced drive is restored from data stored on the other drives.

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Hot-Plug SCSI Hard Drives

IMPORTANT: Before removing or replacing a hot-plug SCSI hard drive, ensure that the affected drive is not in use.

To remove a hot-plug SCSI hard drive:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Open the front bezel door. See "Front Bezel Door (Tower Model Only)" earlier in this chapter.

CAUTION: Remove or replace a hot-plug SCSI hard drive only when the drive failure LED is amber. Data loss can occur if a hard drive is removed when the drive online LED is green. See "Hot-Plug Hard Drive LED Indicators" in Chapter 4 for more information.

3. Push the sliding release button ❶ to unlock the hard drive ejector lever.
4. Swing out the ejector lever ❷, releasing the hard drive.
5. Pull the hard drive ❸ out from the drive cage.

IMPORTANT: Remove or replace only one hot-plug SCSI hard drive at a time. The controller relies on other hard drives to reconstruct data on the replaced hard drive. Drive reconstruction is active when the drive online LED is flashing green.

IMPORTANT: SCSI hard drive blanking panels must fill unused hard drive bays to maintain a proper system cooling.

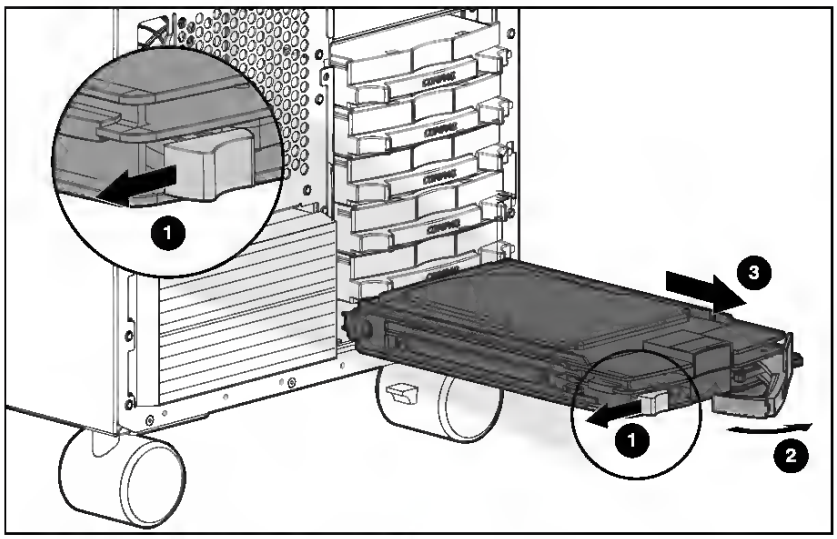

Figure 2-15. Removing a hot-plug SCSI hard drive

Reverse steps 1 through 5 to replace a hot-plug SCSI hard drive.

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Hard Drive Cage with Backplane Board

The ProLiant ML570 server contains two hard drive cages. Eacb hard drive cage supports up to six hard drives.

CAUTION: If the ProLiant ML570 server is set up in an array configuration and an active hard drive is replaced while the system is powered down, the following POST hard drive error message (1786) occurs when the system is powered up:

PRESS <F1> TO BOOT THE SYSTEM AND REBUILD THE REPLACED DRIVE, OR
PRESS <F2> TO BOOT THE SYSTEM WITHOUT REBUILDING THE DRIVE(S).

Pressing F2 causes permanent data loss to the logical hard drive. F2 should be pressed only when all of the hard drives were replaced or when complete data loss is desired.

NOTE: When a hard drive configured for fault tolerance is replaced, the replacement hard drive automatically begins reconstruction. Drive reconstruction is active when the drive online LED is flashing green

To remove the hard drive cage with backplane board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this cbapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove all hard drives from the bays of the cage to be removed. See "Hot-Plug SCSI Hard Drives" earlier in this chapter.
4. Remove the bard drive fan air baffle. See "Hard Drive Fan Air Baffle" earlier in this chapter.

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5. Remove the drive fans. See "Hot-Plug Hard Drive Fans" earlier in this chapter.
6. Remove the four T-15 screws ❶ securing the hard drive cage to the chassis.
7. Pull the hard drive cage assembly ❷ from the front of the chassis.

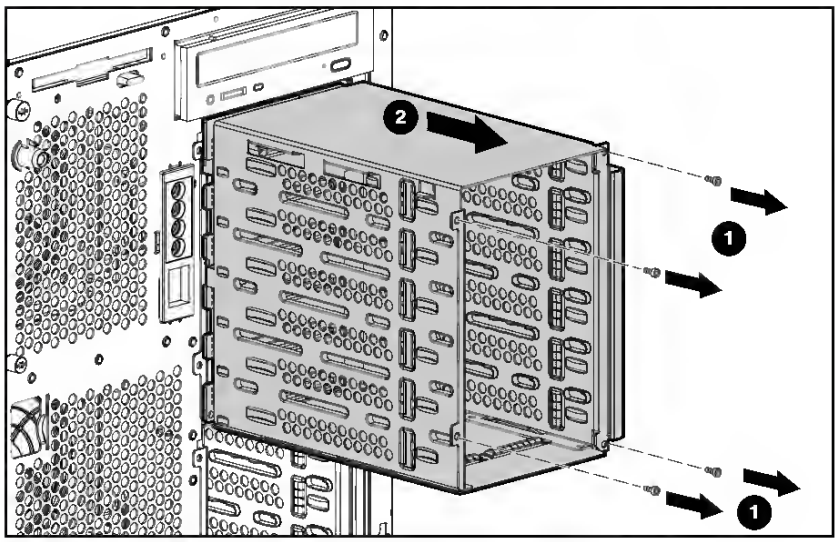

Figure 2-16. Removing the hard drive cage

Reverse steps 1 through 7 to replace the hard drive cage, or cover the opening with a SCSI hard drive blanking panel to maintain proper cooling.

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Removable Media Blanking Panel

To remove a removable media blanking panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Slide the green locking lever ❶ on the outside of the removable media area to release the blanking panel.
4. Pull the removable media blanking panel ❷ from the removable media area.

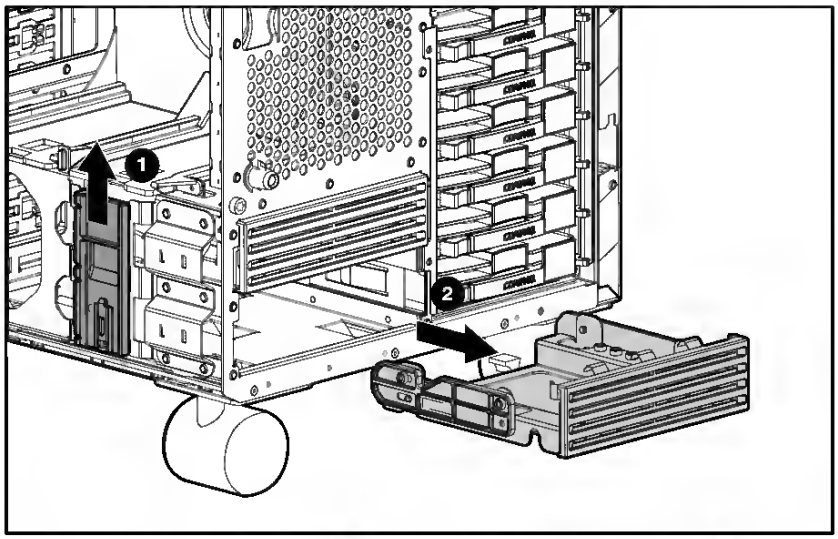

Figure 2-17. Removing a removable media blanking panel from the removable media area

Reverse steps 1 through 4 to install a removable media blanking panel.

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Removable Media Devices

The removable media area contains two bays that can house two media devices each. Media bays with no devices installed must be covered with a removable media blanking panel. To remove an installed media device:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Disconnect all cabling from the removable media device.
4. Slide the green plastic locking lever ❶ on the outside of the removable media area to release the media device.
5. Pull the media device ❷ from the removable media area.

CAUTION: Cover unused media bays with a removable media blanking panel to ensure proper internal airflow.

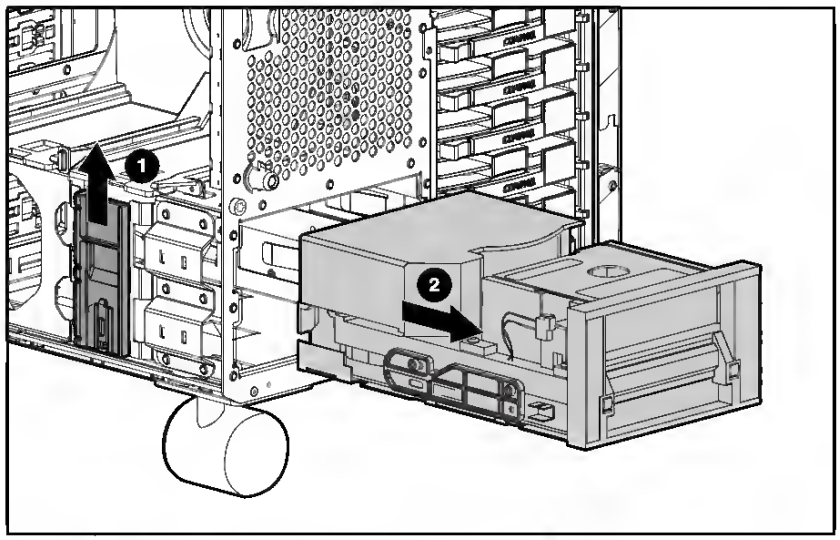

Figure 2-18. Removing a media device from the removable media area

Reverse steps 1 through 5 to replace a removable media device, or cover the opening with a removable media blanking panel.

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CD-ROM Drive

To remove the CD-ROM drive:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the hard drive fan air baffle. See "Hard Drive Fan Air Baffle" earlier in this chapter.
4. Disconnect the power and signal cables from the CD-ROM drive. See "Diskette and CD-ROM Drive Cables" later in this chapter.
5. Remove the redundant CPU fan for easier accessibility. See "Hot-Plug System Fans" earlier in this chapter.
6. Loosen the thumbscrew ❶ located near the bottom of the CPU fan basket to release the metal locking bracket.
7. Slide the metal locking bracket ❷ outward.
8. Pull the CD-ROM drive ❸ out the front of the chassis.

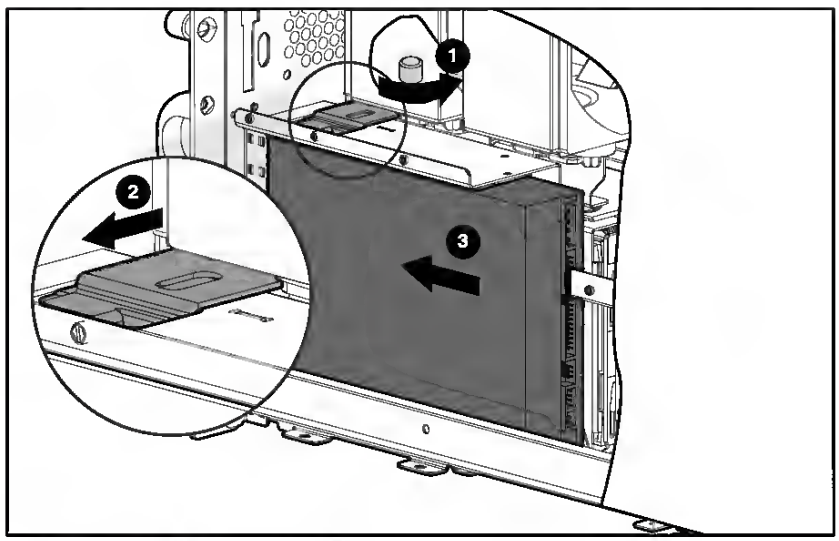

Figure 2-19. Removing the CD-ROM drive

Reverse steps 1 through 8 to replace the CD-ROM drive.

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Diskette Drive

To remove the diskette drive:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Disconnect all cabling from the diskette drive. See "Diskette and CD-ROM Drive Cables" later in this chapter.
4. Loosen the thumbscrew ❶ on the side of the diskette drive.
5. Slide the drive ❷ back, then lift it from the chassis.

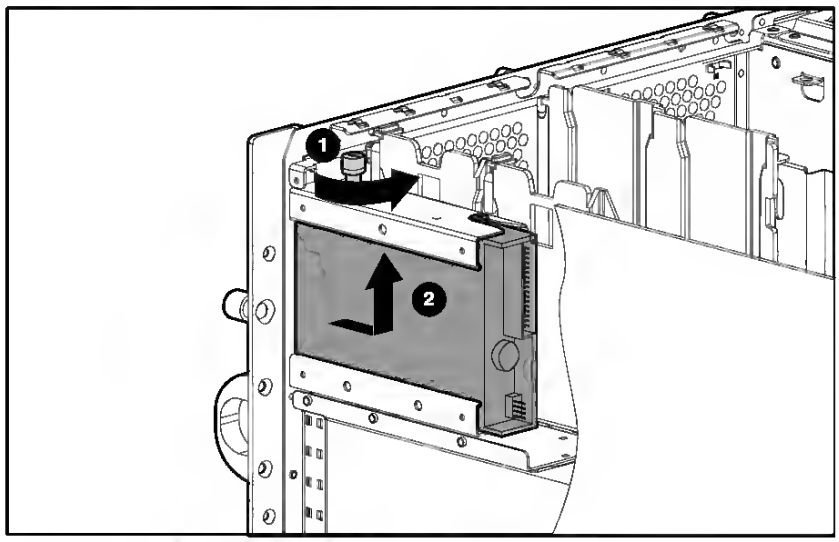

Figure 2-20. Removing the diskette drive

Reverse steps 1 through 5 to replace the diskette drive.

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Cable Routing Diagrams

CAUTION: When routing cables, always ensure that the cables are not in a position in which they can be pinched or crimped.

System Board Power Cables

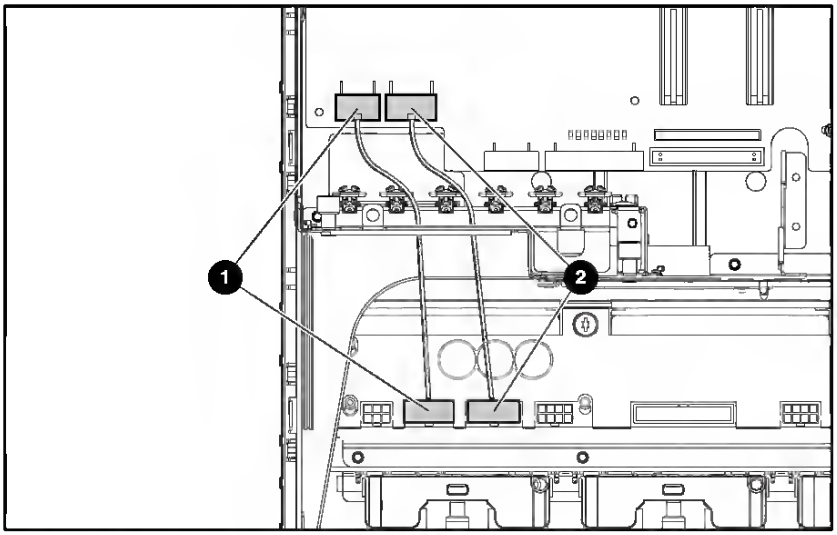

Figure 2-21. System board power cables routing diagram

Table 2-3
System Board Power Cables Routing

Item	Description
❶	Power cable
❷	Power cable

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Diskette and CD-ROM Drive Cables

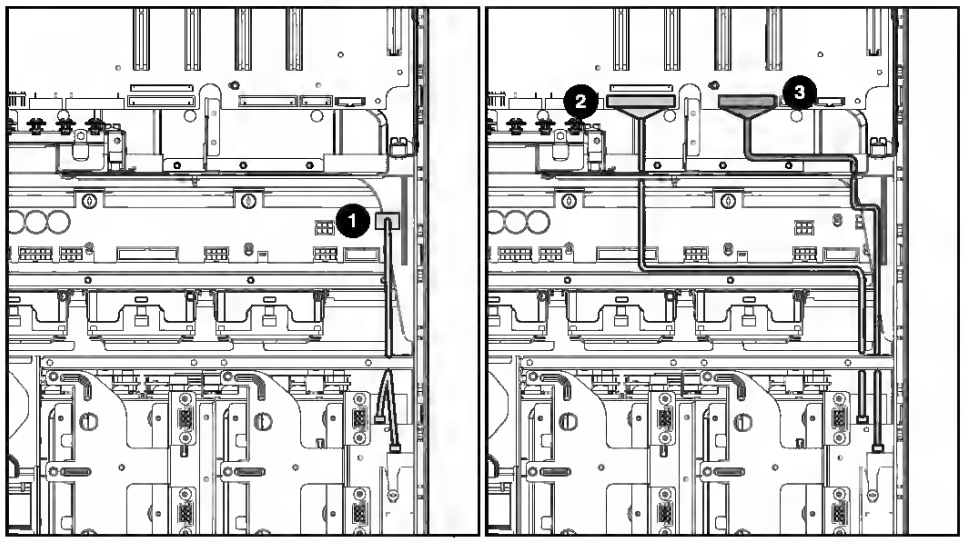

Figure 2-22. Diskette and CD-ROM drive cable routing diagrams

Table 2-4
Diskette and CD-ROM Drive Cables

Item	Description
❶	Power cable for both diskette and CD-ROM drives
❷	Data cable for CD-ROM drive
❸	Data cable for diskette drive

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Hard Drive Fans Signal Cables

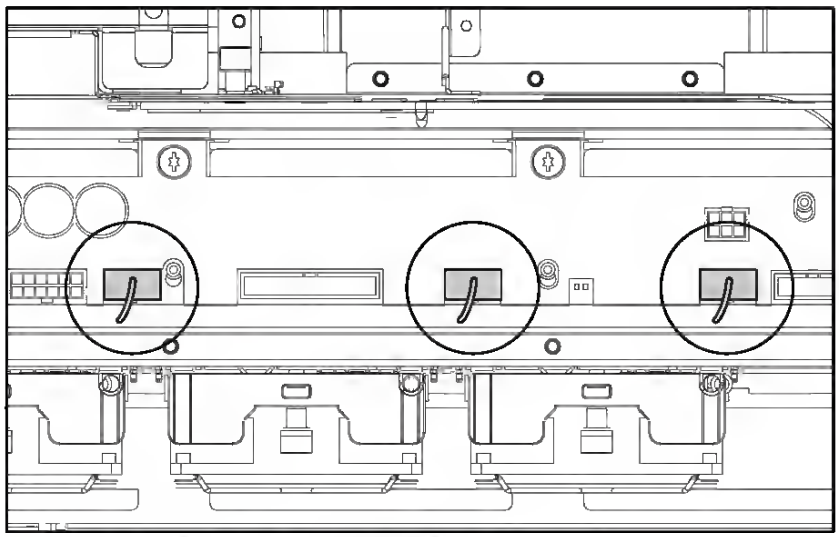

Figure 2-23. Hard drive fans signal cable routing diagram

Peripheral Board Cables

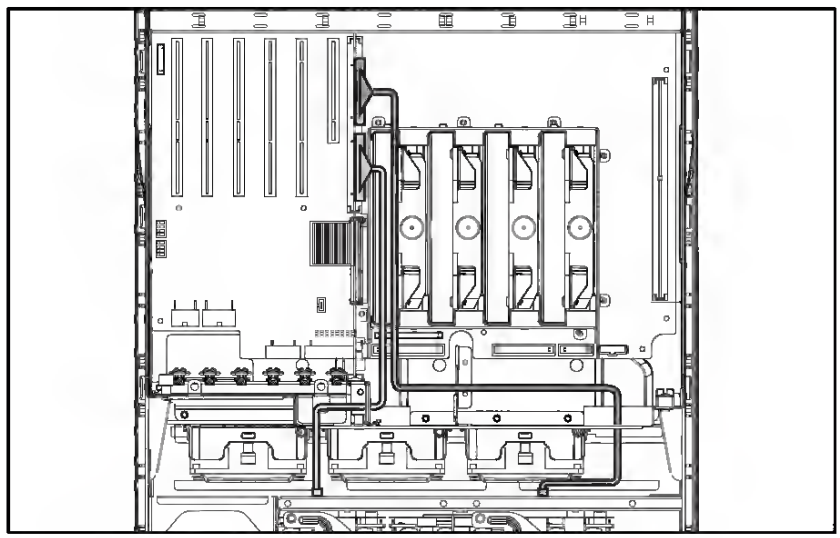

Figure 2-24. Peripheral board cable routing diagram

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Power Backplane Board Cables

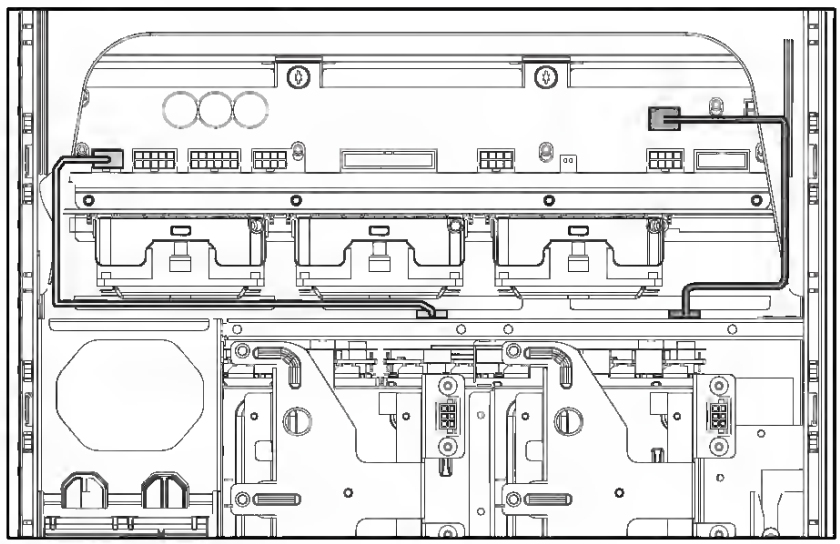

Figure 2-25. Power backplane board cable routing diagram

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Electronics Drawer

WARNING: To reduce the risk of personal injury or damage to the equipment, do not use the electronics drawer handle to lift or move the ProLiant ML570 server.

To remove the electronics drawer from the ProLiant ML570 server:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the CPU fan air baffle. See "CPU Fan Air Baffle" earlier in this chapter.
4. Press the thumb latch ❶ adjacent to the electronics drawer handle to release the electronics drawer.
5. Grasp the electronics drawer handle ❷, then pull the tray from the chassis until it stops.

NOTE: If the server is mounted into a rack, accessibility to the electronics drawer latches can be increased by pulling the server forward from the rack (approximately the depth of the drives) before sliding the electronics drawer from the back of the chassis.

6. Push and hold the latches on the electronics drawer ❸, then slide the tray ❹ out from the chassis.

CAUTION: Do not pull the electronics drawer completely out from the server unless all cables have been disconnected. See additional information below.

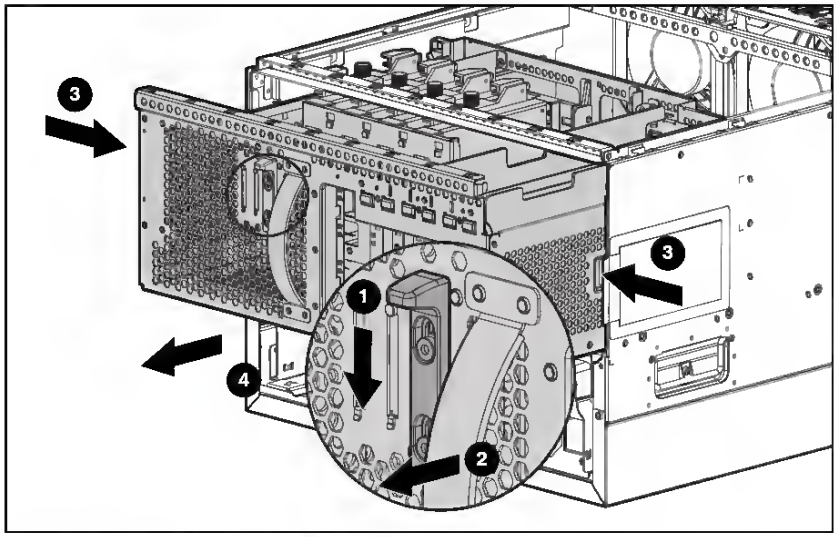

Figure 2-26. Removing the electronics drawer

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If the electronics drawer is to be removed completely from the ProLiant ML570 server, follow these additional steps:

7. Disconnect the SCSI port 1 ❺, and SCSI port 2 ❻ data cables from the peripheral board, then pull the two cables out through the two openings located at the back of the electronics drawer.

8. Disconnect the 2 power supply cables ❼, the I/O fan cable ❽, the power supply backplane sense cable ❾, the IDE CD-ROM drive cable ❿, the diskette drive cable ⓫, and the CPU fan cable ⓬.

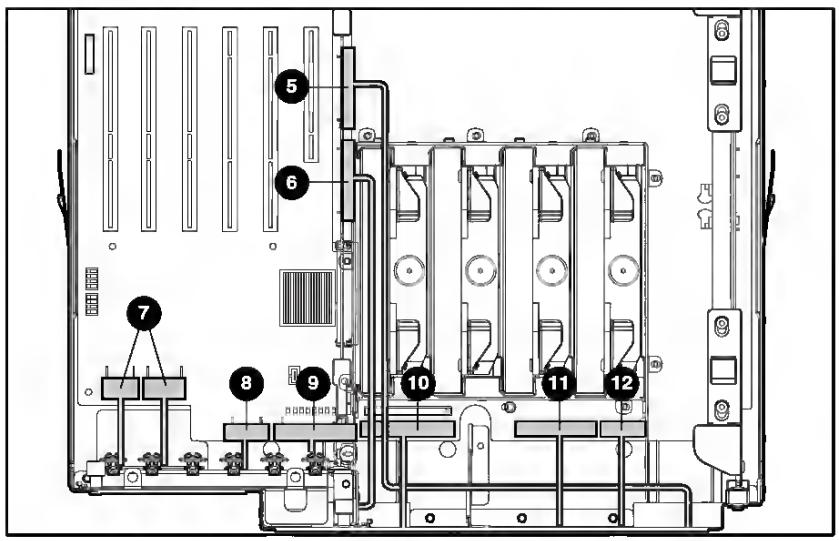

Figure 2-27. Disconnecting the cables from the electronics drawer

9. Disconnect and remove all memory modules, processors, and PCI expansion boards from the system board. Place these components on a nonconductive work surface.

Reverse steps 1 through 9 to replace the electronics drawer.

IMPORTANT: Be sure to install all previously removed memory modules, processors, and PCI expansion boards onto the new electronics drawer. Change the switch settings to match the switch settings on the system board being replaced.

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Memory

The ProLiant ML570 server ships with a minimum of 256 MB of synchronous DRAM (100-MHz, ECC) DIMM memory.

The following guidelines **must** be followed when installing or replacing memory:

- Use only Compaq supported 100-MHz SDRAM DIMMs.
- Install SDRAM DIMMs in the proper socket sequence.
- Install SDRAM DIMMs in sets of four starting from bank 1 through bank 4.
- Install SDRAM DIMMs in the following socket sequence to ensure optimum performance.

See Figure 2-28 for SDRAM DIMM bank and socket locations. Table 2-5 identifies the proper DIMM sequence.

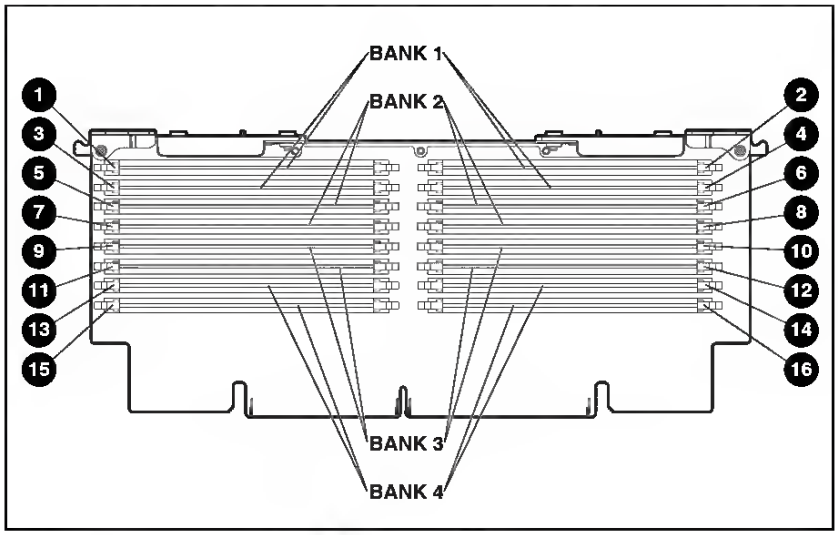

Figure 2-28 SDRAM DIMM socket locations

Table 2-5
SDRAM DIMM Socket Locations

Bank	DIMM Socket	DIMM Socket	DIMM Socket	DIMM Socket
1	❶	❷	❸	❹
2	❺	❻	❼	❽
3	❾	❿	⓫	⓬
4	⓭	⓮	⓯	⓰

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Memory Expansion Board

To remove the memory expansion board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Push in on both sliding locks ❶ to release the ejector levers.
4. Pull the ejector levers ❷ up to loosen the memory expansion board from the system board slot.
5. Lift the memory expansion board ❸ from the system board slot.

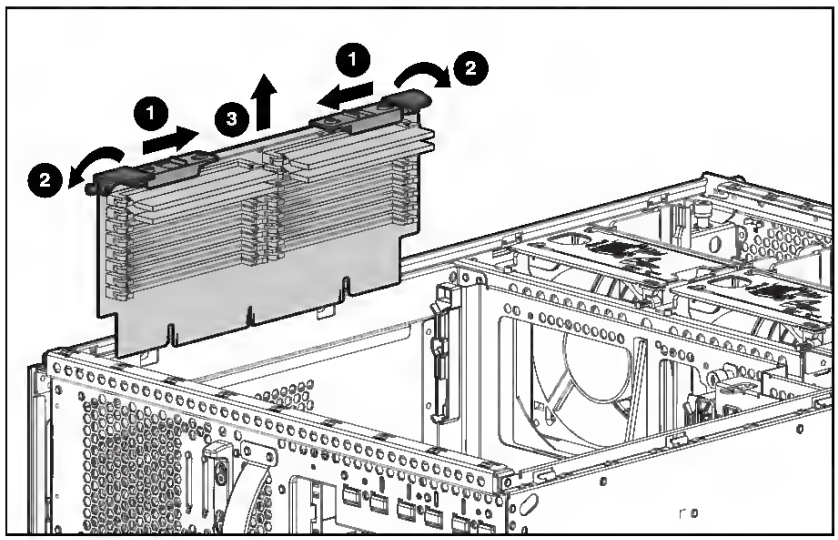

Figure 2-29. Removing the memory expansion board

Reverse steps 1 through 5 to replace the memory expansion board.

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Dual Inline Memory Module Combinations

Table 2-6
Dual Inline Memory Module (DIMM) Combinations

Total Memory	Socket 1	Socket 2	Socket 3	Socket 4	Socket 5	Socket 6	Socket 7	Socket 8
256 MB	64 MB	64 MB	64 MB	64 MB				
768 MB	64 MB	64 MB	64 MB	64 MB	128 MB	128 MB	128 MB	128 MB
512 MB	128 MB	128 MB	128 MB	128 MB				
1 GB	256 MB	256 MB	256 MB	256 MB				
2 GB	256 MB	256 MB	256 MB	256 MB	256 MB	256 MB	256 MB	256 MB
2 GB	512 MB	512 MB	512 MB	512 MB				
3 GB	256 MB	256 MB	512 MB	512 MB	256 MB	256 MB	512 MB	512 MB
4 GB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB

Note: These are examples only. Because the board has 16 sockets, more DIMM combinations can be added as long as the DIMMs are installed in sets of four modules per bank. DIMMs must be identical in each bank

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Dual Inline Memory Modules

To remove an SDRAM DIMM:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the memory expansion board. See "Memory Expansion Board" earlier in this chapter. Set the board on a sturdy nonconductive surface.
4. Pull both SDRAM DIMM socket latches ❶ outward to release the SDRAM DIMM from the DIMM socket.
5. Lift out the SDRAM DIMM ❷.

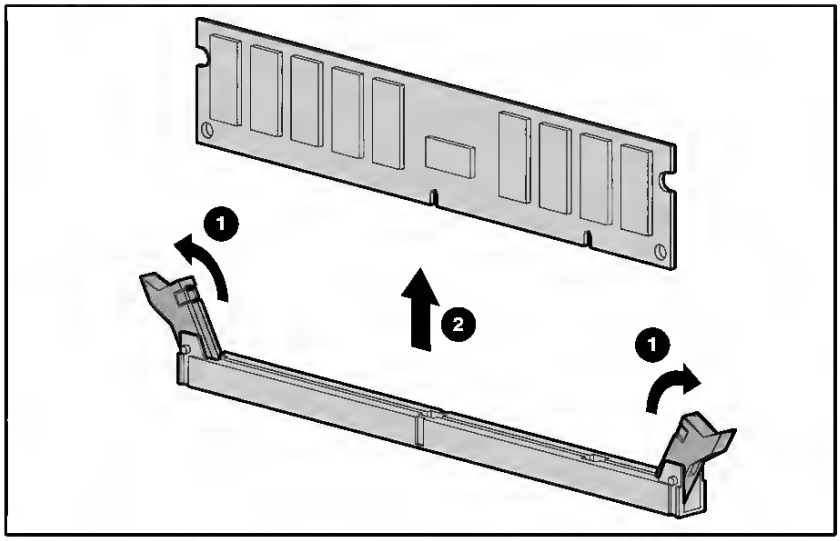

Figure 2-30. Removing an SDRAM DIMM (expansion board removed for clarity)

Reverse steps 1 through 5 to replace an SDRAM DIMM.

IMPORTANT: A memory module can be installed only one way. Be sure to match the two key sockets on the module with the two tabs on the memory socket. Push the module down into the socket, ensuring that the module is fully inserted and properly seated.

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Peripheral Board (Non-Hot-Pluggable)

To remove the peripheral board (non-bot-pluggable):

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Unplug all power supplies. See "Hot-Plug Power Supplies" later in this chapter.

CAUTION: Power supplies must be unplugged when servicing the peripheral board.

4. Remove data and signal cables from the board. See "Peripheral Board Cables" earlier in this chapter.
5. Loosen the two T-15 chassis screws ❶ securing the peripheral board to tbe chassis.
6. Pull the ejectors levers ❷ up to loosen the peripheral board from the expansion slot.
7. Pull the peripheral board ❸ from the system board expansion slot.

CAUTION: Rotating the peripheral board release levers a full 90 degrees can cause the levers to break.

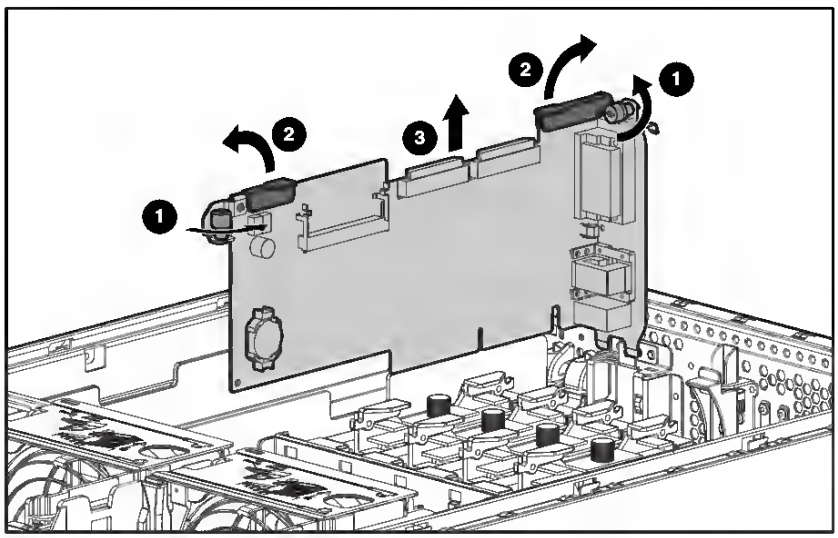

Figure 2-31. Removing the peripheral board (non-hot-pluggable)

Reverse steps 1 through 7 to replace the peripheral board (non-bot-pluggable).

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I/O Expansion Boards

Hot-Pluggable I/O Expansion Boards

CAUTION: Do not attempt a PCI Hot Plug procedure if your operating system does not provide PCI Hot Plug support, or if you do not have the appropriate device drivers installed. Failure to take these precautions causes system shutdown and risks data integrity.

CAUTION: To avoid critical errors, do not open the slot release lever if the green power LED is on or blinking. Use the PCI Hot Plug button or the software application to turn off power to the slot.

Use either the PCI Hot Plug button on the server or your operating system PCI Hot Plug utility to control the PCI Hot Plug slots.

- The PCI Hot Plug button and the PCI Hot Plug utility allow you to power on or power off a hot-pluggable I/O expansion board slot. However, the PCI Hot Plug Button allows direct access at each hot-pluggable expansion slot.
- PCI Hot Plug software support for each operating system is available online. For more information, see the "PCI Hot Plug Important Facts" section in the online *PCI Hot Plug Administration Guide* on the Server Documentation CD.

The ProLiant ML570 server includes seven system board expansion slots. Figure 2-32 shows the system board expansion slot locations. Table 2-7 identifies each slot.

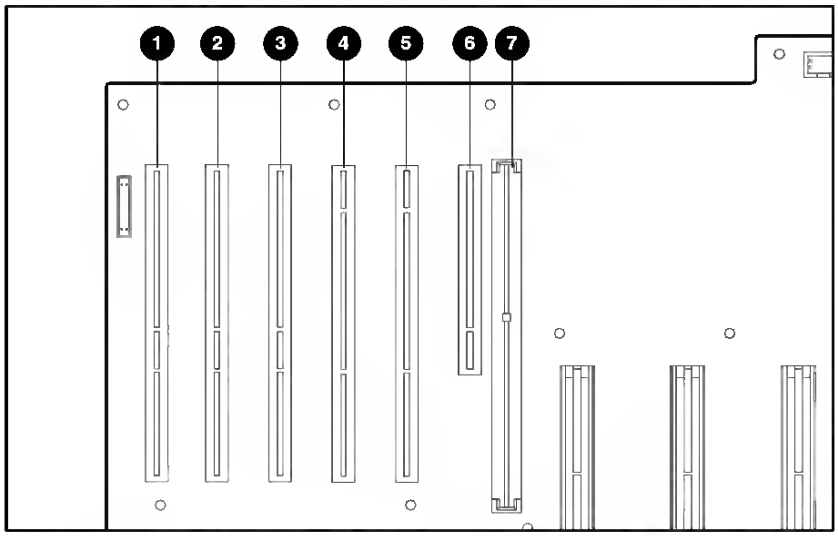

Figure 2-32. System board hot-plug and non-hot-plug expansion slot locations

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Table 2-7
System Board Expansion Slots

Slot	Description
❶	PCI slot, 33-MHz/64-bit (non-hot-pluggable)
❷	PCI slot, 33-MHz/64-bit
❸	PCI slot, 33-MHz/64-bit
❹	PCI slot, 66-MHz/64-bit
❺	PCI slot, 66-MHz/64-bit
❻	PCI slot, 33-MHz/64-bit (non-hot-pluggable)
❼	Peripheral board slot (non-hot-pluggable)

PCI Hot Plug expansion slots are accessible using the PCI Hot Plug access door.

NOTE: The following procedure is for hot-pluggable I/O expansion boards. The board illustrated in Figure 2-34 is an example of an extended SCSI type I/O expansion board.

To remove a hot-pluggable I/O expansion board:

1. Unlock and open the PCI Hot Plug access door.

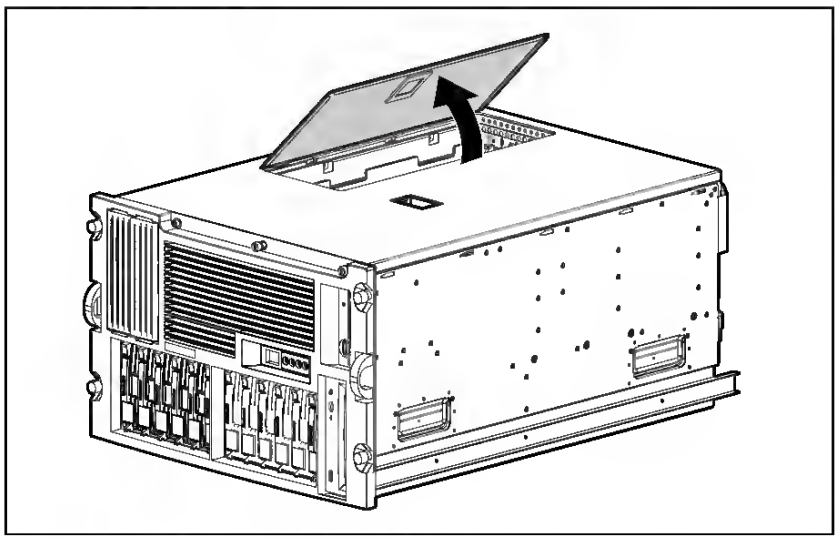

Figure 2-33. Opening the PCI Hot Plug access door

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2. Press the PCI Hot Plug button ❶ to turn off power to the slot. The green LED indicator flashes during the power down transition and turns off when system shutdown is complete. For more information, refer to the *Compaq ProLiant ML570 Server Setup and Installation Guide*.

CAUTION: DO NOT open the slot release lever unless the green PCI Hot Plug LED power indicator for the slot is off. If the lever is opened before power to the slot is turned off, system power down and subsequent data loss can occur. For more information on the power LED indicators, refer to Chapter 4, "Connectors, Switches, and LED Status Indicators."

3. When the green LED for the slot is off, disconnect the cables to the selected hot-pluggable I/O expansion board.
4. Push the tab ❷ on the slot release lever, then swing the slot release lever ❸ back to unlock the hot-pluggable I/O expansion board.
5. Push the PCI retainer tab ❹ until it locks into the open position.
6. Lift the hot-pluggable I/O expansion board ❺ from the system board slot.

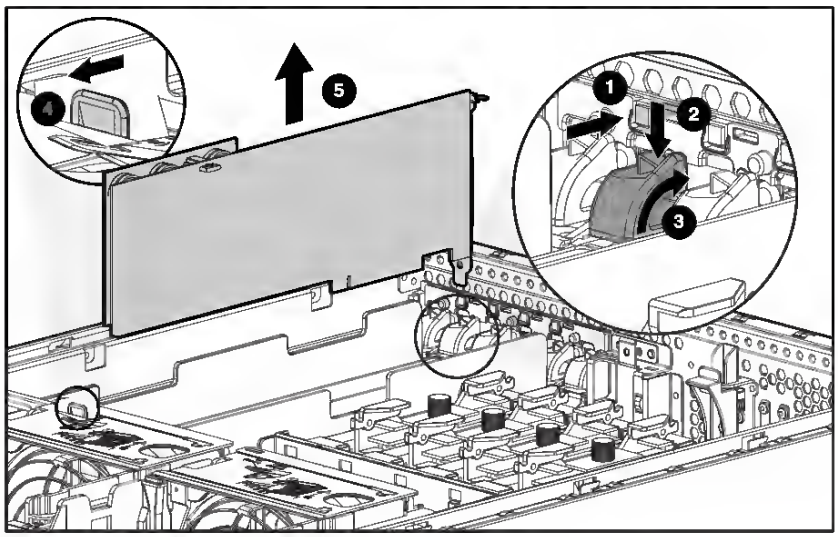

Figure 2-34. Removing a hot-pluggable I/O expansion board

Reverse steps 1 through 6 to replace the hot-pluggable I/O expansion board. Push the PCI retainer tab back from the open position before inserting any hot-pluggable I/O expansion boards.

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IMPORTANT: Installing a 33-MHz expansion board into either of the 66-MHz slots (4 and 5) decreases the bus speed in both slots to 33 MHz.

Non-Hot-Pluggable I/O Expansion Board

To remove a non-hot-pluggable I/O expansion board:

1. Perform the preparation procedures. See "Non-Hot-Pluggable Parts" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.

   NOTE: The electronics drawer must be completely in or completely out of the chassis to remove a full-size expansion board.

3. Refer to steps 4 through 6 in "Hot-Pluggable I/O Expansion Board" earlier in this section.

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Compaq NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN Controller

To remove the Compaq NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL) controller:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Disconnect the RJ-45 connector from the rear of the NC3123 controller.
4. Press the release tab ❶ on the expansion slot latch.
5. Swing open the expansion slot latch ❷ to unlock the controller.
6. Lift the controller ❸ out of the system board expansion slot.

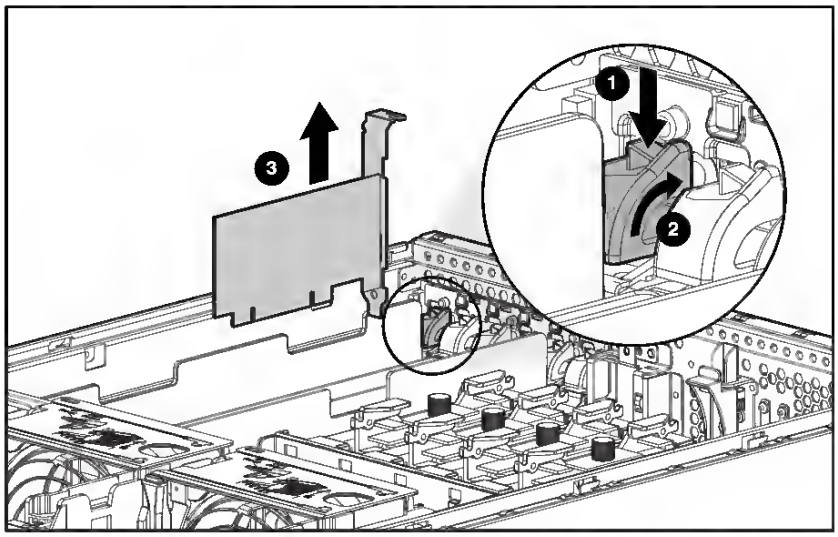

Figure 2-35. Removing an NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL) controller

Reverse steps 1 through 6 to replace an NC3123 Fast Ethernet NIC PCI 10/100 WOL controller.

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PCI Hot Plug LED Switchboard

To remove the PCI Hot Plug LED switchboard:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Slide out the electronics drawer until it stops. See "Electronics Drawer" earlier in this chapter.
4. Disconnect the expansion board power cable ❶ from the system board.
5. Remove the three T-15 screws ❷ securing the switchboard to the rear section of the expansion board area.
6. Lift the PCI Hot Plug switchboard ❸ from the chassis.

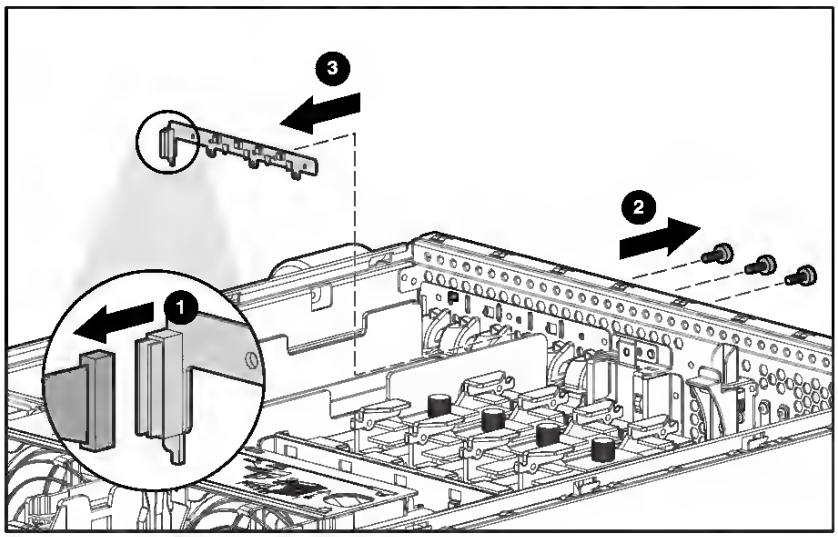

Figure 2-36. Removing the PCI Hot Plug switchboard

Reverse steps 1 through 6 to replace the PCI Hot Plug switchboard.

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Processors, Terminator Boards, and Processor Cage

Processors

The ProLiant ML570 server supports up to four processors. Figure 2-37 shows the location of the processors. Table 2-8 identifies processor locations on the ProLiant ML570 server.

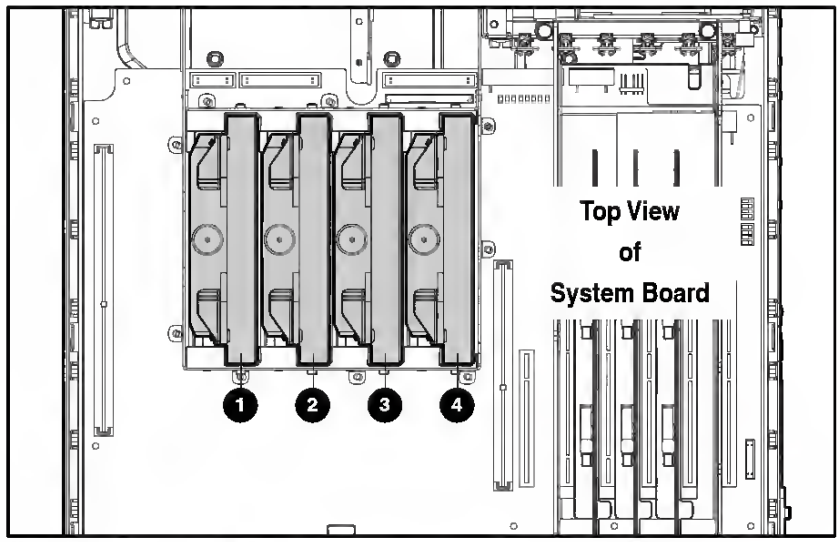

Figure 2-37. Processor locations

Table 2-8
Processor Locations

Item	Description
❶	Processor 1
❷	Processor 2
❸	Processor 3
❹	Processor 4

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To remove a processor:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the CPU fan air baffle. See "CPU Fan Air Baffle" earlier in this chapter.
4. Loosen the thumbscrew ❶ located on the top of the processor.
5. Pull up, then swing open the ejector levers ❷ on both sides of the processor.
6. Lift the processor ❸ from the slot.

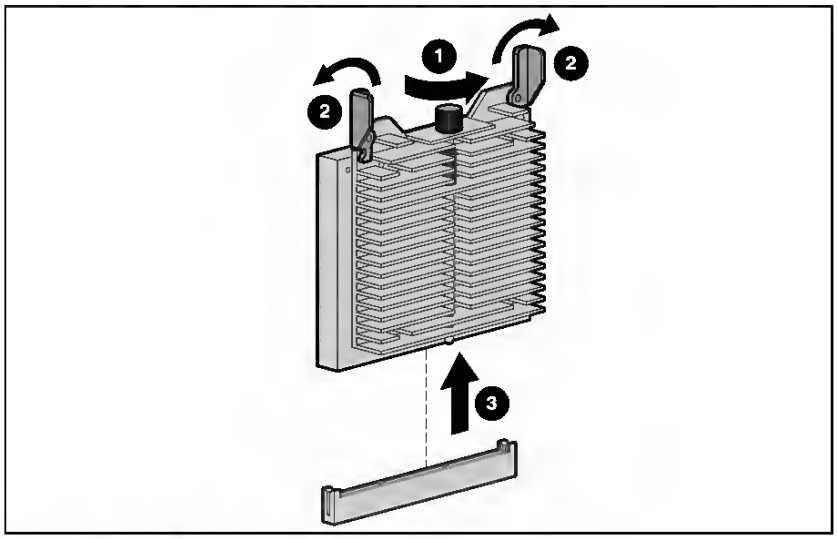

Figure 2-38. Removing a processor

Reverse steps 1 through 6 to replace a processor.

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Terminator Boards

To remove the terminator board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Loosen the thumbscrew ❶ securing the terminator board to the system board.
3. Pull up, then swing open the ejector levers ❷ on both sides of the terminator board.
4. Lift the terminator board ❸ out of the system board slot.

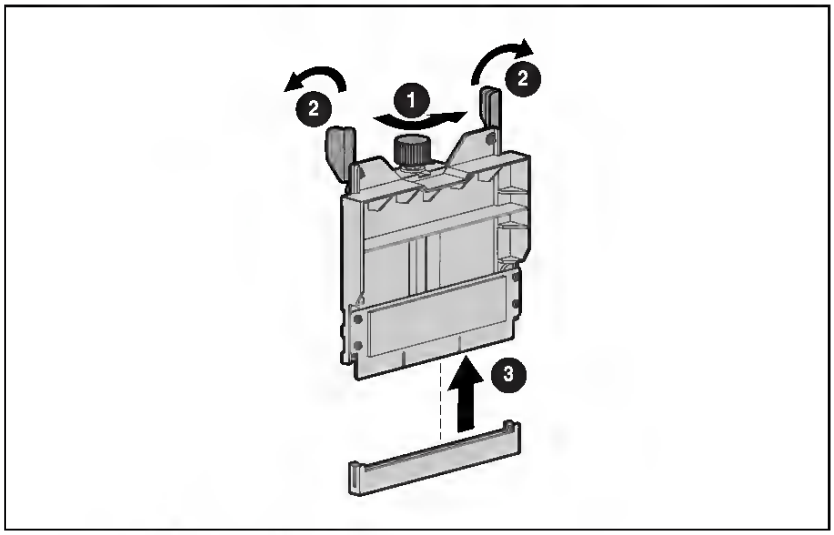

Figure 2-39. Removing the terminator board

Reverse steps 1 through 4 to replace the terminator board.

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Processor Cage

To remove the processor cage:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove all processors and terminator boards. See "Processors" and "Terminator Boards" earlier in this chapter.
4. Remove the 13 T-15 screws ❶ securing the processor bracket to the electronics tray.
5. Lift the processor cage ❷ from the electronics tray.

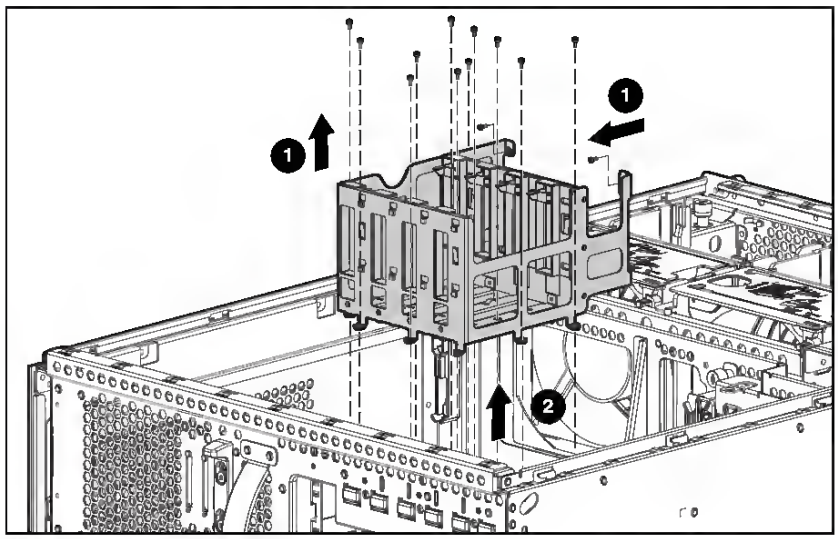

Figure 2-40 Removing the processor cage

Reverse steps 1 through 5 to replace the processor cage.

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Hot-Plug Power Supplies

The ProLiant ML570 server uses a hot-plug, 450-watt power supply. Only one power supply is required for each single, six-bay drive cage. The power supply must be located in the primary bay. A second power supply is considered redundant for a single hard drive cage configuration, but necessary for a two hard drive cage configuration. When two hard drive cages are used, a third power supply is supported as an option for redundancy. The location of the power supplies is shown in Figure 2-41 and the power supply bay configuration is described in Table 2-9.

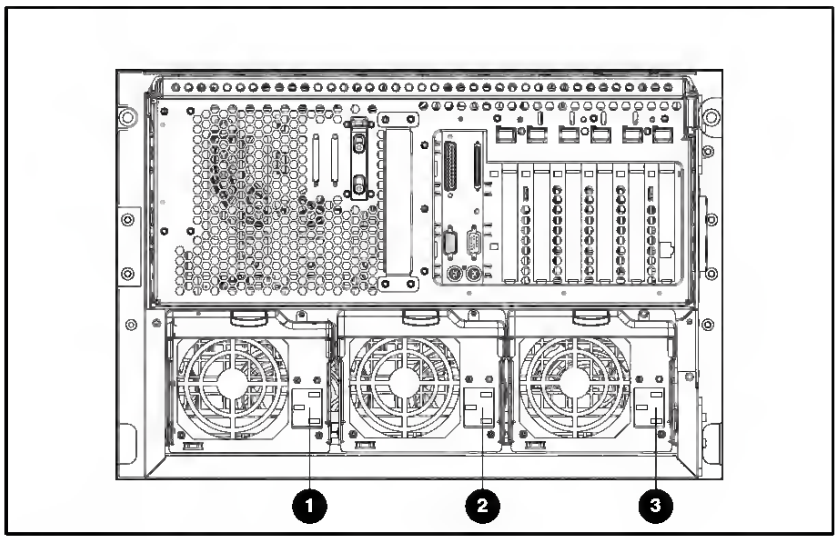

Figure 2-41. Power supply bay locations

Table 2-9
Power Supply Bay Configuration

Bay	Description
❶	Primary hot-plug power supply
❷	Optional hot-plug power supply ■ Redundant with one six-bay SCSI hard drive cage ■ Required with two six-bay SCSI hard drive cages
❸	Optional hot-plug power supply (redundant for all configurations)

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To remove a hot-plug power supply:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Press the thumb latch ❶ in the middle of the power supply handle to release the handle.

   NOTE: If a security screw is present on the power supply, remove the screw before removing the power supply.

3. Pull the handle ❷ outward.
4. Slide the power supply ❸ from the chassis.

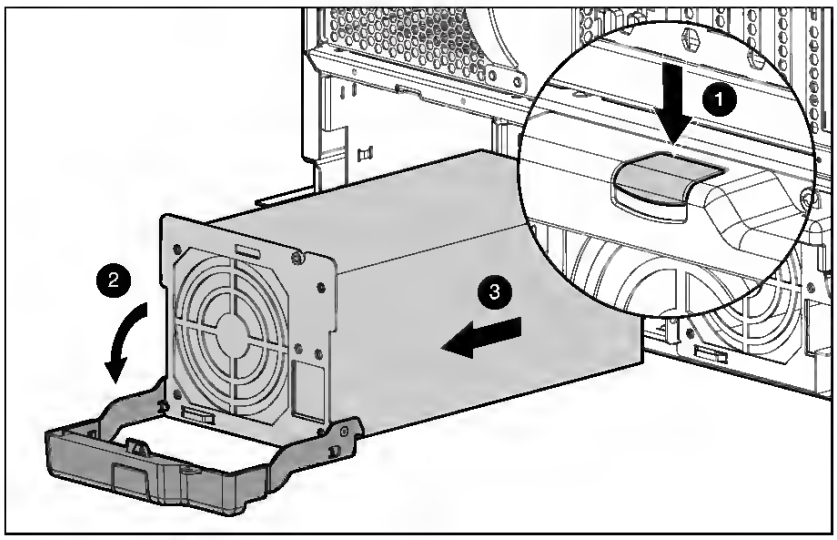

Figure 2-42. Removing a hot-plug power supply

Reverse steps 1 through 4 to replace a hot-plug power supply.

CAUTION: When the power supply is not being replaced, cover the opening with a power supply blanking panel to maintain proper airflow.

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Power Supply Blanking Panel

CAUTION: When the power supply is not being replaced, cover the opening with a power supply blanking panel to maintain proper airflow.

To remove a power supply blanking panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the two T-15 screws ❶ securing the power supply blanking panel to the chassis.
3. Pull the power supply blanking panel ❷ away from the chassis.

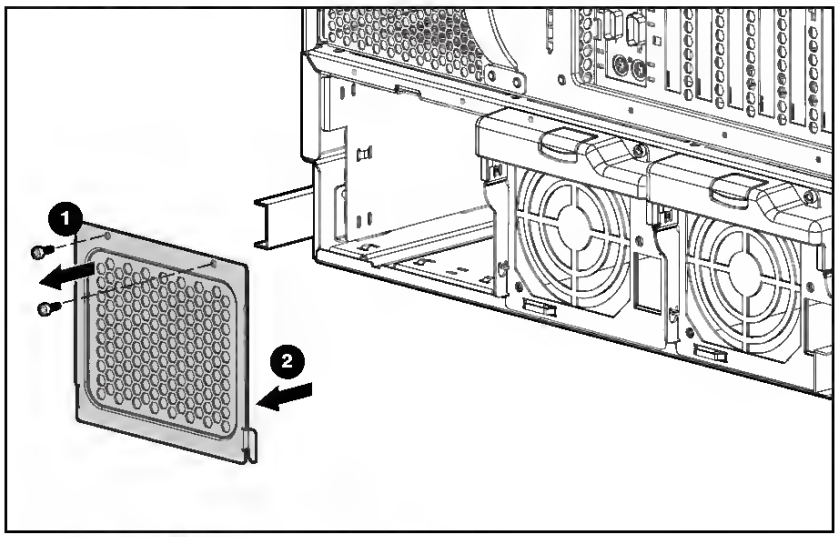

Figure 2-43 Removing the power supply blanking panel

Reverse steps 1 through 3 to replace a power supply blanking panel.

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Power Backplane Board

To remove the power backplane board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Slide the electronics drawer partially out of the chassis. See "Electronics Drawer" earlier in this chapter.
4. Remove the hard drive fan air baffle. See "Hard Drive Fan Air Baffle" earlier in this chapter.
5. Disconnect all cables from the power backplane board. See "Cable Routing Diagrams" earlier in this chapter.
6. Loosen the two T-15 thumbscrews ❶.
7. Slide the power backplane board ❷ toward the power supplies, then lift the power backplane board from the chassis.

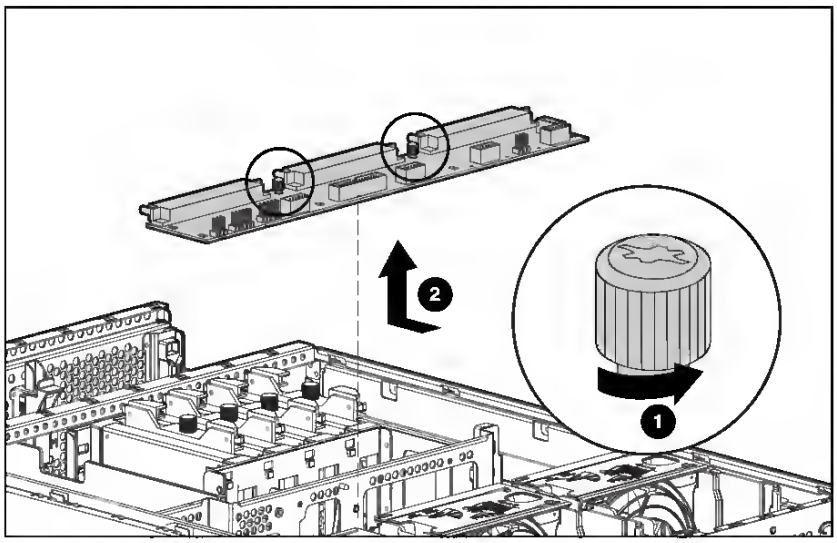

Figure 2-44. Removing the power backplane board

Reverse steps 1 through 7 to replace the power backplane board.

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Power On/Standby Switch and Cable Assembly

To remove the Power On/Standby switch and cable assembly:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the hard drive fan air baffle. See "Hard Drive Fan Air Baffle" earlier in this chapter.
4. Disconnect the power switch cable ❶ from the power backplane board.
5. Press the tabs ❷ inward on both sides of the switch.

   NOTE: Compaq recommends pressing the tabs with a 4-mm flat-blade screwdriver.

6. With the tabs released, pull the switch and cable assembly ❸ out the front of the bezel.

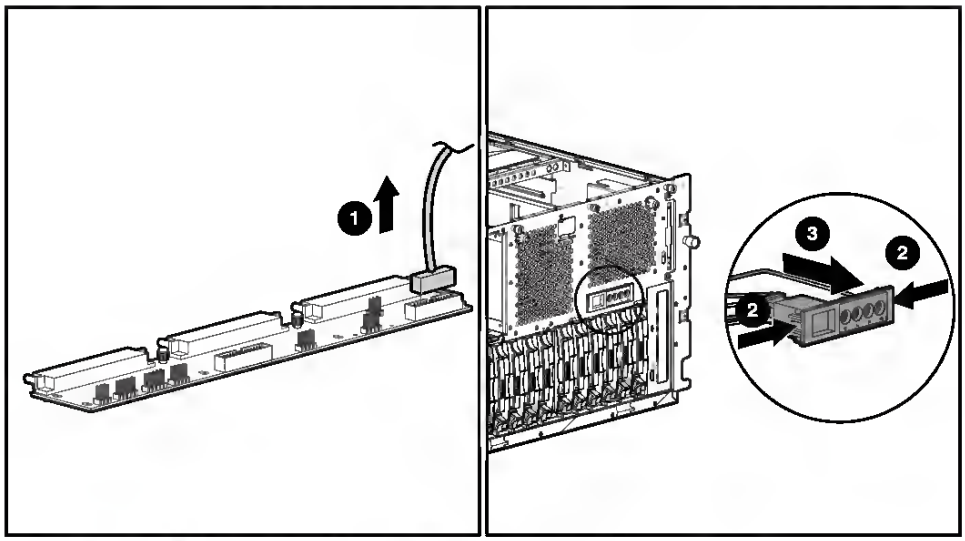

Figure 2-45. Removing the Power On/Standby switch and cable assembly

Reverse steps 1 through 6 to replace the Power On/Standby switch and cable assembly.

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Insulator Basket

To remove the insulator basket:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Unsnap the retaining pins ❶ securing the insulator basket to the electronics tray.
4. Lift the insulator basket ❷ from the electronics tray.

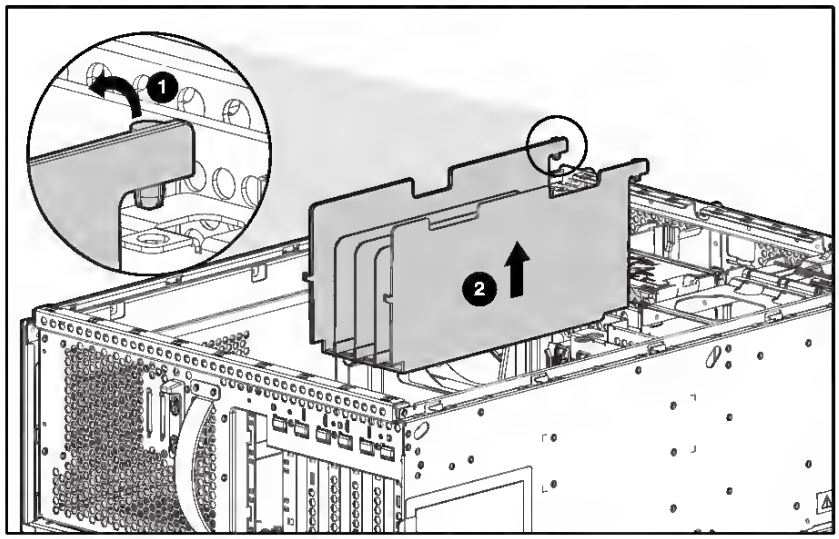

Figure 2-46. Removing the insulator basket

Reverse steps 1 through 4 to replace the insulator basket.

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System Board

To remove the system board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the electronics drawer. See "Electronics Drawer" earlier in tbis cbapter.
3. Remove the insulator basket. See "Insulator Basket" earlier in this chapter.
4. Disconnect and remove all expansion boards from the system board. Place these boards on a nonconductive work surface. See "I/O Expansion Boards" earlier in this chapter.
5. Remove the peripheral board. See "Peripheral Board (Non-Hot-Pluggable)" earlier in this chapter.
6. Remove the memory expansion board. See "Memory Expansion Board" earlier in this chapter.
7. Remove all processors and terminator boards. See "Processors, Terminator Boards, and Processor Cage" earlier in this cbapter.
8. Remove the processor cage. See "Processor Cage" earlier in this chapter
9. Disconnect all signal and power cables from the system board. See "Cable Routing Diagrams" earlier in this cbapter.
10. Remove the ten T-15 screws securing the system board to the electronics drawer.
11. Lift the system board ❶ from the electronics drawer.

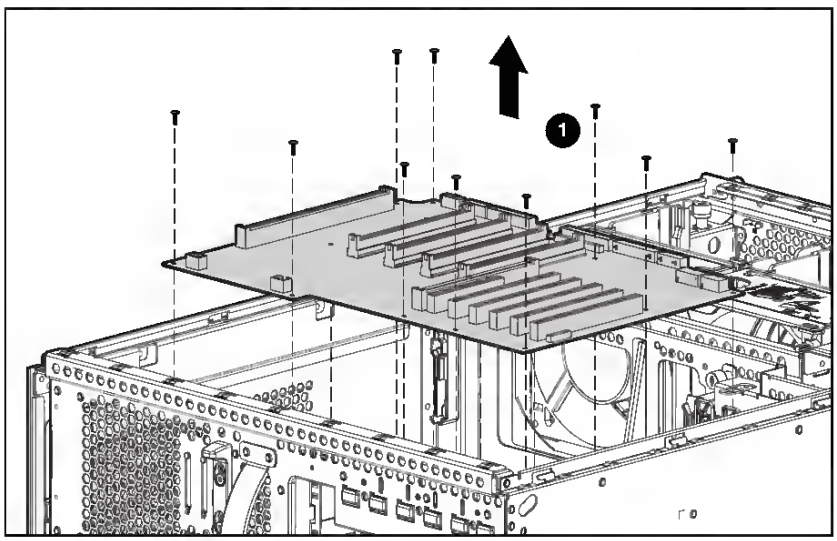

Figure 2-47. Removing the system board

Reverse steps 1 through 11 to replace the system board.

IMPORTANT: Change the switch 1 and switch 2 settings to match the switch settings on the board being replaced. Install all removed boards onto the replacement system board.

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Replacement Battery

To remove the CMOS battery and to install the replacement battery:

CAUTION: Do not dispose of batteries, battery packs, and accumulators with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to either Compaq or your Compaq authorized service provider.

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. See "Access Panel (Tower and Rack)" earlier in this chapter.
3. Remove the peripheral board. See "Peripheral Board (Non-Hot-Pluggable)" earlier in this chapter.

WARNING: Disconnect all power cords to completely remove power from the system before removing the peripheral board.

4. Remove the lithium battery from the peripheral board as shown in Figure 2-48.

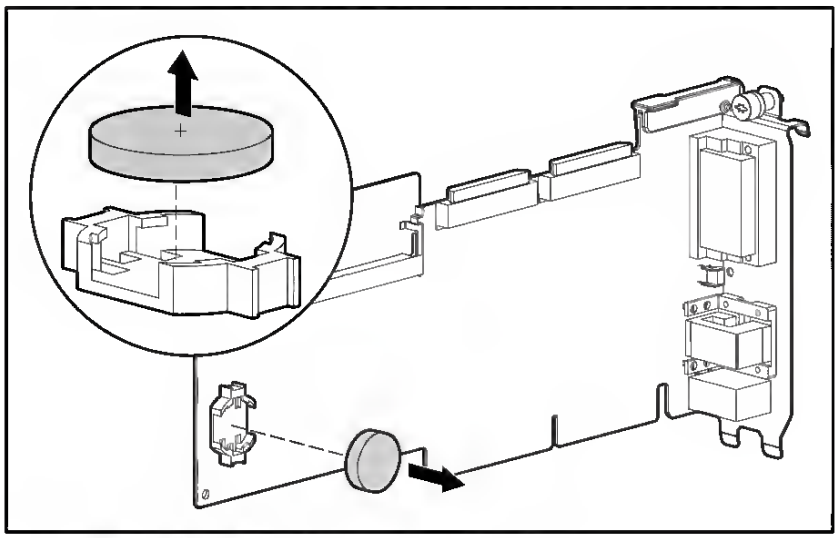

Figure 2-48. Removing the lithium battery from the peripheral board

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5. Snap the replacement battery into the battery connector on the peripheral board as shown in Figure 2-49.

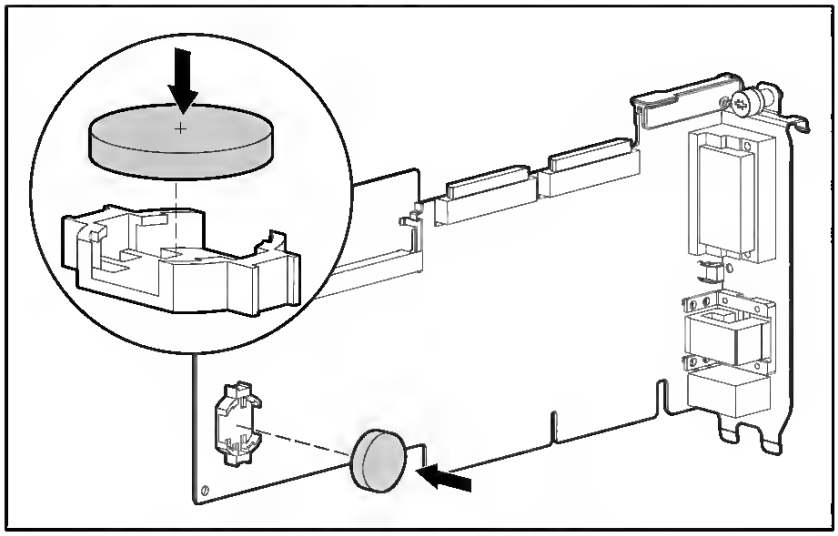

Figure 2-49. Installing the replacement battery on the peripheral board

CAUTION: Loss of BIOS settings occurs when the flat disk battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.

6. Run the System Configuration Utility to reconfigure the system. See Chapter 3, "Diagnostics and Troubleshooting" for more information.

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Chapter 3

Diagnostics and Troubleshooting

This chapter describes software and firmware diagnostic tools available for all Compaq server products. The sections in this chapter are:

- Diagnostic Tools Utility Overview
- Default Configuration
- INSPECT
- Utilities Access
- Power-On Self-Test
- Diagnostics Software
- Array Diagnostic Utility
- Integrated Management Log
- Rapid Error Recovery
- Remote Management Features
- *ROMPaq*™ Error Recovery Options
- *Compaq Insight Manager*™

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Diagnostic Tools Utility Overview

These utilities were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing Compaq server hardware.

Table 3-1
Diagnostic Tools

Tool	What it is	How to run it
Compaq Diagnostics Program	Utility to assist testing and verifying operation of Compaq hardware. If problems are found, Compaq Diagnostics isolates failure(s) down to the replaceable part, whenever possible.	Diagnostics and utilities are located on a partition on the hard drive and must be accessed when a system configuration error is detected during Power-On Self-Test (POST). Compaq Diagnostics software is also available on the Compaq *SmartStart*™ and Support Software CD. A Diagnostics diskette can be created from the SmartStart and Support Software CD, and Diagnostics run from diskette.
INSPECT	INSPECT provides a report detailing system information.	INSPECT can be run from either the main menu of the System Configuration Utility or the Compaq Diagnostics program.
Compaq Insight Manager AND Compaq Insight Manager Agent	A client/server application used to remotely manage Compaq hardware in a network environment. Reports hardware fault conditions (both failure and prefailure) and collects data for reporting and graphing.	For more information, refer to the Compaq Management CD and the *Compaq Insight Manager User Guide* More information on viewing and printing the event list can be found in the "Compaq Insight Manager" section of this chapter.
Compaq Survey Utility	An online information gathering agent that runs on servers, gathering critical hardware and software information from various sources. A utility for servers running Microsoft Windows NT or Novell NetWare. If a significant change occurs between data gathering intervals, previous information is marked, and the *survey text file* is overwritten to reflect the latest configuration and changes since last configuration. This allows a historical record of change events for server hardware and software.	Install the Compaq Integration Maintenance Utility from SmartStart, or from the Compaq Management CD.

continued

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Table 3-1
Diagnostic Tools *continued*

Tool	What it is	How to run it
Array Diagnostics Utility (ADU)	A Windows-based tool designed to run on all Compaq servers that support Compaq array controllers and are running SmartStart 4.10 or later. Two main functions of ADU are to collect all possible information about the array controllers in the system, and generate a list of detected problems. This tool is available for all Compaq servers covered by this guide.	Use the information provided in ADU later in this chapter.
Drive Array Advanced Diagnostics (DAAD)	The predecessor to ADU, DAAD is a DOS-based tool for Compaq servers with Smart Array Controllers. DAAD collects information about the array controllers in the system and offers a list of detected problems.	For a list of Compaq servers still supported by this tool, visit the Compaq website: http://www.compaq.com/support/files/servers/softpaqs/rompaq/daad.html
Integrated Management Log (IML)	A log of system events, such as system failures or nonfatal error conditions. View events in the IML: ■ On the Integrated Management Display ■ From within Compaq Insight Manager ■ From within Compaq Survey Utility	The IML requires Compaq operating system-dependent drivers. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers.
System Configuration Utility (SCU)	Utility to easily configure the hardware installed in or connected to the server. Specifically, it can: ■ Resolve resource conflicts in areas such as memory, port addresses, and interrupts (IROs) ■ Automatically configure PCI boards ■ Manage installation of processor upgrades, and mass storage devices such as hard drives, tape drives, and diskette drives ■ Store configuration information in nonvolatile memory ■ Assist in installation of an operating system ■ Assist in running diagnostic tools such as Test and INSPECT ■ Assist in reconfiguring a server that cannot otherwise be restored	If the server has a bootable CD-ROM drive, run Compaq System Configuration Utility directly from the Support Software CD supplied with the Compaq Smart Array Controller Option Kit, or SmartStart and the Support Software CD supplied with server. Use the CD supplied for the latest version. If the server does not have a bootable CD-ROM drive, create diskettes with latest version of the System Configuration Utility from the Support Software CD, or the SmartStart and Support Software CD.

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Default Configuration

When the system is first powered up, the system ROM detects the unconfigured state of the hardware and provides default configuration settings for most devices. By providing this initialization, the system can run Diagnostics and other software applications before running the normal SmartStart and System Configuration programs.

Default Configuration Messages

IMPORTANT: If you chose to format and partition the boot drive before running SmartStart and the System Configuration programs, this action prohibits creating a System Partition and the offline remote management features that it provides. If a System Configuration, Diagnostics, or SmartStart and Support Software CD is in the CD-ROM drive prior to powering up the server, the system ROM powers up to that utility.

If the system ROM does not detect one of those CDs, you are prompted for the intended operating system. The system restarts if any operating system-dependent configurations have changed with the new operating system selection. If the selected operating system-dependent configurations are the same as the current configurations, the system starts normally. If you enter a wrong choice, on subsequent restarts you may change the operating system.

INSPECT

INSPECT provides configuration information such as the contents of the operating system (OS) startup files, current memory configuration, ROM version, and Integrated Management Log (IML) information. It operates with MS-DOS and in the MS-DOS emulation mode of MS OS/2.

Running INSPECT

1. Power down the server, then power up, and then press **F10** when the cursor displays in the upper right corner of the screen.
2. At the main menu, select Diagnostics and Utilities.
3. Press **Enter.**
4. Select Inspect Computer, and then press **Enter.**

   NOTE: If Diagnostics is not installed on the hard drive, System Configuration prompts you to insert the Diagnostics diskette into drive A.

5. Follow the instructions. The first time the INSPECT displays, select Entire System, and then press **Enter.**

Printing the INSPECT Listing

Select Print on the INSPECT screen to print a copy of the INSPECT listing. Keep a copy of the listing with each server for later reference.

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Utilities Access

The SmartStart and Support Software CD contains the SmartStart program and many of the Compaq utilities needed to maintain the system, including:

- System Configuration Utility
- Array Configuration Utility
- Array Diagnostic Utility (ADU)
- ROMPaq Firmware Upgrade Utilities
- Compaq Diagnostics

CAUTION: Do not select the Erase utility when running the SmartStart and Support Software CD. The erase utility causes data loss to the entire system.

Running the Utilities from the System Partition

If the system is installed with SmartStart, the Compaq utilities are automatically available on the system partition. The system partition could also have been created during a manual system installation.

To run the utilities on the system partition, start the system, and then press **F10** when you see:

Press F10 for system partition utilities.

Then select the desired utility from one of the following menus:

- System Configuration menu
  - System Configuration Utility
  - Array Configuration Utility
- Diagnostics and Utilities menu
  - Compaq Diagnostics (Test and INSPECT)
  - The ROMPaq Firmware Upgrade Utility

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Running the Utilities from Diskette

- Run the utilities from their individual diskettes. If you have a utility diskette newer than the version on the SmartStart and Support Software CD, use that diskette.
- Create a diskette version of the utility from the SmartStart and Support Software CD.

To create diskette versions of the utilities from the CD:

1. Start the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Create Support Software Disks, and then select Next.
3. Select the diskette you would like to create from the list, and then follow the instructions on the screen.

Running the Utilities from the Compaq SmartStart and Support Software CD

IMPORTANT: Only the System Configuration Utility, the Array Configuration Utility, and the Array Diagnostic Utility (ADU) can be executed from the SmartStart and Support Software CD. All other utilities must be executed from either the system partition or from diskette.

To run these utilities directly from the SmartStart and Support Software CD:

1. Start the SmartStart and Support Software CD.
2. From the System Utilities screen, select the utility you wish to run, and then select Next.
   - To execute the System Configuration Utility, select Run System Configuration Utility.
   - To execute the Array Configuration Utility, select Run Array Configuration Utility.
   - To execute the Array Diagnostic Utility (ADU), select Run Array Diagnostic Utility.

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Power-On Self-Test

Power-On Self-Test (POST) is a series of diagnostic tests that automatically run on Compaq computers when the system is powered up. POST checks the following assemblies to ensure that the computer system is functioning properly:

- System ROM
- Keyboard
- Power supply
- System board
- Memory
- Memory expansion boards
- Controllers
- Diskette drives
- Hard drives
- Fans

POST Error Messages

If POST finds an error in the system, an error condition is indicated by an audible and visual message. If an error code displays on the screen during POST or after resetting the system, use the instructions in the POST Error Messages table (Table 3-2).

NOTE: Many of the actions listed require you to run Diagnostics or the System Configuration Utility. Steps for running these utilities are provided following the POST Error Messages tables

The Recommended Action column in Table 3-2 lists the steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the error condition has been corrected. If the error code is redisplayed, perform the next step, and then run the Diagnostics program again. Follow tbis procedure until Diagnostics no longer detects an error condition.

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Table 3-2
POST Error Messages

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
A Critical Error occurred prior to this power-up	None	A catastrophic system error, which caused the server to crash, has been logged.	Run Diagnostics. Replace failed assembly as indicated.
Unsupported Processor Detected System Halted	1 long, 1 short	Processor not supported by current system ROM	Check documentation for supported processors, and if supported, remove the processor and update the system to latest ROM.
FATAL ROM ERROR: The System ROM is not properly programmed	1 long, 1 short	ROM incorrectly programmed in factory	Replace the physical ROM part.
101-ROM Error	1 long, 1 short	System ROM checksum	Run Diagnostics, then replace failed assembly as indicated.
101-I/O ROM Error	None	Options ROM checksum	Run Diagnostics, then replace failed assembly as indicated.
102-System Board Failure	None	DMA, timers	Replace the system board. Run the System Configuration Utility.
104-ASR-2 Timer Failure	None	System board failure	Run Diagnostics. Replace failed assembly as indicated.
105-Current System ROM is corrupt – now booting redundant System ROM	2 long	Nonbooted ROM image is corrupt	Flash the ROM utilizing ROMPaq.
162-System Options Not Set	2 short	Configuration incorrect	Run the System Configuration Utility and correct.
163-Time & Date Not Set	2 short	Invalid time or date in configuration memory	Run the System Configuration Utility and correct.
164-Memory Size Error	2 short	Configuration memory incorrect	Run the System Configuration Utility and correct.
172-Configuration Nonvolatile Memory Invalid	None	Nonvolatile configuration corrupt or jumper installed	Run the System Configuration Utility and correct.
173-Slot ID Mismatch	None	Board replaced, configuration not updated	Run the System Configuration Utility and correct.
174-Configuration/ Slot Mismatch Device Not Found	None	EISA or PCI board not found	Run the System Configuration Utility and correct.
175-Configuration/ Slot Mismatch Device Found	None	EISA or PCI board added, configuration not updated	Run the System Configuration Utility and correct.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
177-Configuration Not Complete	None	Incomplete system configuration	Run the System Configuration Utility and correct.
178-Processor Configuration Invalid	None	Processor type or step does not match configuration memory	Run the System Configuration Utility and correct.
180-Log Reinitialized	None	N/A	N/A
201-Memory Error	None	RAM failure	Run Diagnostics, then replace failed assembly as indicated.
203-Memory Address Error	None	RAM failure	Run Diagnostics, then replace failed assembly as indicated.
207-Invalid Memory Configuration – Check DIMM [SIMM] Installation	None	Memory module installed incorrectly	Verify placement of memory modules.
208-Invalid Memory Speed – Check DIMM [SIMM] Installation	1 long, 1 short	The speed of the memory is too slow. ■ xx00 = expansion board SIMMs are too slow ■ 00yy = system board SIMMs are too slow ■ xx and yy have a corresponding bit set	The speed of the memory modules must be 60 ns. Verify the speed of the memory modules installed, and replace if slower than 60 ns.
209-Memory Detection Failure. Check Memory Installation	1 long, 1 short	Unable to size memory	Check DIMM installation and if error persists, call Compaq authorized service provider.
211-Cache Switch Set Incorrectly	None	Switch not set properly during installation or upgrade	Verify switch settings.
212-System Processor Failed/ Mapped out	1 short	Processor in slot *X* failed	Run Diagnostics, then replace failed processor.
218-Cache Accelerators Not Installed. System Halted.	None	Cache accelerators not installed or improperly installed	Check cache accelerator installation.
219-Tag Update Rules SRAM Failure. System Halted	None	Catastrophic chipset failure	Call Compaq authorized service provider.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
219-Snoop Rules SRAM Failure. System Halted.	None	Catastrophic chipset failure	Call Compaq authorized service provider.
220-Cache Accelerator Slot *x* Initialization Failed. System Halted.	None	Cache accelerator in slot *x* improperly installed or bad	Check cache accelerator installation and if properly installed, replace.
301-Keyboard Error	None	Keyboard failure	Power down the computer, then reconnect the keyboard.
301-Keyboard Error or Test Fixture Installed	None	Keyboard failure	Replace the keyboard.
* ZZ-301-Keyboard Error	None	Keyboard failure	1. A key is stuck. Try to free it. 2. Replace the keyboard.
303-Keyboard Controller Error	None	System board, keyboard, or mouse controller failure	Run Diagnostics, then replace failed assembly as indicated.
304-Keyboard or System Unit Error	None	Keyboard, keyboard cable, or system board failure	1. Make sure the keyboard is attached. 2. Run Diagnostics to determine whether the keyboard, keyboard cable, or system board is in error. 3. Replace the part indicated.
40*X*-Parallel Port *X* Address Assignment Conflict	2 short	Both external and internal ports are assigned to parallel port *X*	Run the System Configuration Utility and correct.
601-Diskette Controller Error	None	Diskette controller circuitry failure	1. Make sure the diskette drive cables are attached. 2. Replace the diskette drive and/or cable. 3. Replace the system board.
605-Diskette Drive Type Error	2 short	Mismatch in drive type	Run the System Configuration Utility to set diskette type correctly.
1151-Com Port 1 Address Assignment Conflict	2 short	Both external and internal serial ports are assigned to COM1.	Run the System Configuration Utility and correct.

* ZZ represents the Keyboard Scan Code.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1152-Com Port 2, 3, or 4 Address Assignment Conflict	2 short	Both external and internal serial ports are assigned to COM2, COM3, or COM4.	Run the System Configuration Utility and correct.
1610-Temperature violation detected. Waiting for system to cool	2 short	Ambient system temperature too hot	Check fan in system environment.
1611-Fan failure detected	2 short	Required fan not installed or spinning	Check fans.
1611-I/O Fan (Fan *X*) failure detected	2 short	I/O fan failed	Replace the failed fan.
1611-CPU Fan (Fan *X*) failure detected	2 short	CPU fan failed	Replace the failed fan.
1612-Primary power supply failure	2 short	Primary power supply has failed	Replace power supply as soon as possible.
1613-Low System Battery	None	Real-time clock system battery is running low on power.	Run Diagnostics. Replace failed assembly as indicated.
1615-Power Supply Failure, Power Supply Unplugged, or Power Supply Fan Failure in Bay *X*	None	A power supply has failed.	Replace or check specified power supply.
1617-Fan controller not responding	2 short	Fan controller failure	Check and replace failed controller assembly.
1617-I/O Fan controller not responding	2 short	I/O fan controller failure	Check and replace failed controller assembly.
1617-CPU Fan controller not responding	2 short	CPU fan controller failure	Check and replace failed controller assembly.
1618-PCI slots powered down. Check PCI hot plug enabler connectors.	None	PCI Hot Plug enabler is missing or failed.	Check and replace missing or failed assembly.
1620-Locked SCSI Bus Detected. Verify SCSI bus cabling. System halted.	None	SCSI bus failure	Run Diagnostics. Replace failed assembly as indicated.
1621-Current SCSI bus cable configuration is not recommended	None	Improper SCSI bus cabling	Check documentation for proper SCSI bus cabling.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1622-Internal SCSI Jumper Board Not Installed	None	The system has detected that the array enabler board is not installed.	Install the array enabler board.
1703-SCSI cable error detected. Internal SCSI cable not attached to system board connector. System halted.	None	Incorrect cabling	Ensure that the integrated SCSI controller has SCSI termination attached.
1703-SCSI Cable Error Detected Terminated cable attached to output connector of SCSI backplane. System Halted	None	Terminated cable has erroneously been attached to the output connector of the SCSI backplane.	Remove the terminated cable.
1703-SCSI Cable Error Detected Must be configured for Single backplane, Simplex or Duplex System Halted	None	SCSI cables have been connected in an unsupported configuration.	Reconnect the SCSI cables in a supported configuration.
1703-SCSI Cable Error Detected Simplex Mode detected, but LED cable not installed System Halted	None	LED cable has failed or is not connected properly.	Reconnect or replace the LED cable.
1720-Slot *x* Drive Array – SMART Drive Detects Imminent Failure SCSI: Port *y*: SCSI ID *x*	None	Indicated drive has reported a SMART predictive-failure condition and may fail at some time in the future.	If drive is part of a nonfault-tolerant configuration, back up all data before replacing drive and restore all data afterward. If drive is part of a fault-tolerant configuration **do not** replace drive unless all other drives in array are online. Press **F1** to resume

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1724-Slot *x* Drive Array – Physical Drive Position Change(s) Detected – Logical drive configuration has automatically been updated	None	Logical drive configuration has been updated automatically following physical drive position changes.	Press **F1** to resume
1726-Slot *x* Drive Array – Array Accelerator Memory Size Change Detected	None	Indicates array accelerator configuration has been updated automatically due to replacement of array accelerator (or controller) with one having different memory size.	Press **F1** to resume
1727-Slot *x* Drive Array – New Logical Drive(s) Attachment Detected. If more than 32 logical drives, this message will be followed by: Auto-configuration failed: Too many logical drives.	None	Controller has detected an additional array of drives that were attached when the power was off. The logical drive configuration information has been updated to add the new logical drives. The maximum number of logical drives supported is 32. Additional logical drives will not be added to the configuration.	Press **F1** to resume
1730-Fixed Disk 0 does not support DMA Mode	None	Hard drive error	Run the System Configuration Utility and correct.
1731-Fixed Disk 1 does not support DMA Mode	None	Hard drive error	Run the System Configuration Utility and correct.
1740-Fixed Disk 0 failed Set Block Mode command	None	Hard drive error	Run the System Configuration Utility and correct.
1741-Fixed Disk 1 failed Set Block Mode command	None	Hard drive error	Run the System Configuration Utility and correct.
1750-Fixed Disk 0 failed Identify command	None	Hard drive error	Run the System Configuration Utility and correct.
1751-Fixed Disk 1 failed Identify command	None	Hard drive error	Run the System Configuration Utility and correct.
1760-Fixed Disk 0 does not support Block Mode	None	Hard drive error	Run the System Configuration Utility and correct.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1761-Fixed Disk 1 does not support Block Mode	None	Hard drive error	Run the System Configuration Utility and correct.
1764-Slot *x* Drive Array – Capacity Expansion Process is temporarily disabled (followed by any one of these statements): ■ Expansion will resume when Array Accelerator has been reattached. ■ Expansion will resume when Array Accelerator has been replaced. ■ Expansion will resume when Array Accelerator RAM allocation is successful. ■ Expansion will resume when Array Accelerator battery reaches full charge. ■ Expansion will resume when automatic data recovery has been completed.			Reattach or replace array accelerator, wait until the array accelerator batteries have charged, or for Automatic Data Recovery to complete, as indicated.
1765-Slot *x* Drive Array Option ROM Appears to Conflict with an ISA Card. ISA cards with 16-bit memory cannot be configured in memory range C0000 to DFFFF along with the SMART-2/E 8-bit Option ROM due to EISA bus limitations. Please remove or reconfigure the ISA card.			Remove or reconfigure conflicting ISA cards. Disable "shared memory" on any ISA network cards that may be installed.
1766-Slot *x* Drive Array requires System ROM Upgrade. Run Systems ROMPaq Utility.			Run the latest Systems ROMPaq Utility to upgrade the System ROMs.
1767-Slot *x* Drive Array Option ROM is Not Programmed Correctly or may Conflict with the Memory Address Range of an ISA Card. Check the Memory Address Configuration of installed ISA Card(s) or run Options ROMPaq Utility to attempt SMART-2/E Option ROM Reprogramming.			Remove or reconfigure conflicting ISA cards, especially any cards that are not recognized by the System Configuration Utility. Try reprogramming the ROM on the SMART-2/E Controller using the latest Options ROMPaq (version 2.29 or higher).
1768-Slot *x* Drive Array-Resuming logical drive expansion process.	None	SMART-2 Controller error	No action required. Displays whenever a controller reset or power cycle occurs while array expansion is in progress.
1769-Slot *x* Drive Array – Drive(s) disabled due to failure during expand. Select F1 to continue with logical drives disabled. Select F2 to accept data loss and to re-enable logical drives.	None	SMART-2 Controller error. Data has been lost while expanding the array, therefore, the drives have been temporarily disabled	Press **F2** to accept the data loss and re-enable the logical drives. Restore data from backup.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1771-Primary Disk Port Address Assignment Conflict	None	Internal and external hard drive controllers are both assigned to the primary address.	Run the System Configuration Utility and correct.
1772-Secondary Disk Port Address Assignment Conflict	None	Address Assignment Conflict. Internal and external hard drive controllers are both assigned to the secondary address.	Run the System Configuration Utility and correct.
1773-Primary Fixed Disk Port Assignment Conflict	None	Fixed disk drive error	Run the System Configuration Utility and correct.
1774-Slot *x* Drive Array – Obsolete data found in Array Accelerator Select F1 to discard contents of Array Accelerator. Select F2 to write contents of Array Accelerator to drives.	None	SMART-2 Controller error	Data found in array accelerator is older than data found on drives. Press **F1** to discard the older data in the array accelerator and retain the newer data on the drives.
1775-Slot *x* Drive Array – ProLiant Storage System Not Responding SCSI Port (*y*) Check storage system power switch and cables. Turn the system power off while checking the ProLiant power and cable connections, then turn the system power back on to retry.	None	Storage system problem	Power down the system. Check external ProLiant power switch – external drives must all be powered up before or at the same time as the main system. Check cables. If retry does not help, try replacing the cable, ProLiant firmware, ProLiant backplane, or the Smart Array Controller.
1776-Drive Array SCSI Port Termination Error	None	External and internal SCSI drives are both configured to Port 1.	Reconfigure drives.
1777-Drive Array External Drive Subsystem Error	None	Cooling fan failure, internal temperature alert, or open side panel	Inspect for cooling fan failure or open side panel.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1778-Drive Array resuming Automatic Data Recovery process	None	This error message displays whenever a controller reset or power cycle occurs while Automatic Data Recovery is in progress.	No action necessary.
1779-Drive Array Controller detects replacement drives	None	Intermittent drive failure and/or possible loss of data	If this error message displays and drive *X* has not been replaced, this indicates an intermittent drive failure. This message also displays once immediately following drive replacement whenever data must be restored from backup.
1780-Disk 0 Failure	None	Hard drive/format error	Run Diagnostics. Replace failed assembly as indicated.
1781-Disk 1 Failure	None	Hard drive/format error	Run Diagnostics. Replace failed assembly as indicated.
1782-Disk Controller Failure	None	Hard drive circuitry error	Run Diagnostics. Replace failed assembly as indicated.
1783-Slot *x* Drive Array Controller Failure	None	ROM installation problem or array accelerator board problem. If this error message displays immediately following a ROM installation, the ROM is defective or not installed properly.	Check to see if: ■ The array accelerator board is attached properly. ■ The array controller is firmly inserted into its slot. If error recurs, upgrade the System ROMs. Otherwise, replace the Smart Array Controller.
1784-Drive Array Drive Failure, Physical Drive	None	Defective drive and/or cables	Check for loose cables. Replace defective drive *X* and/or cable(s).

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1785-Drive Array not Configured	None	Configuration error	All following actions are related to error 1785 with specific descriptions.
Run Compaq Array Configuration Utility	None	Configuration error	Run the Array Configuration Utility.
No drives detected.	None	Configuration error	Power down system and check SCSI cable connections to make sure drives are attached properly.
Array Accelerator Memory Size Increased	None	Configuration error	Run the System Configuration Utility.
External Cable(s) Attached to Wrong SCSI Port Connector(s).	None	Configuration error	Power down system and swap SCSI power connectors to prevent data loss.
Drive positions cannot be changed during Capacity Expansion.	None	Configuration error	Run Array Diagnostic Utility (ADU) if previous positions are unknown. Then power down system and move drives to their original positions.
Drive positions appear to have changed.	None	Configuration error	Run Array Diagnostic Utility (ADU) if previous positions are unknown. Then power down the system and move drives to their original positions.
Configuration information indicates drive positions beyond the capability of this controller. This may be due to drive movement from a controller that supports more drives than the current controller.	None	Configuration error	To avoid data loss, power down and reattach drives to the original controller.
Configuration information indicates drives were configured on a controller with a newer firmware version.	None	Configuration error	To avoid data loss, reattach drives to original controller or upgrade controller firmware to the version of the original controller using Option ROMPaq. Press **F1** to resume

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1786-Drive Array Recovery Needed The following drive(s) need Automatic Data Recovery: Drive *X*. Select "F1" to continue with recovery of data to drive(s). Select "F2" to continue without recovery of data to drive(s).	None	Interim Data Recovery mode. Data has not been recovered yet.	Press **F1** to allow Automatic Data Recovery to begin. Data is automatically restored to drive *X* when the drive is replaced or when existing drive is working. -Or- Press **F2** to allow the system to continue operating in the Interim Data Recovery mode.
1787-Drive Array Operating in Interim Recovery Mode. Physical drive replacement needed Drive *X*	None	Hard drive *X* failed or cable is loose or defective. Following a system restart, this message reminds you that drive *X* is defective and fault tolerance is being used.	1. Replace drive *X* as soon as possible. 2. Check loose cables. 3. Replace defective cables.
*1788-Incorrect Drive Replaced: Drive *X* Drive(s) were incorrectly replaced Drive *Y* Select "F1" to continue – drive array will remain disabled. Select "F2" to reset configuration – all data will be lost.	None	The drives are disabled when they are not installed in their original positions. *	Reinstall the drives correctly as indicated. Press **F1** to restart the computer with the drive array disabled. -Or- Press **F2** to use the drives as configured and lose all the data on them.

* The 1788 error message might display inadvertently due to a bad power cable connection to the drive or by noise on the data cable. If this message was due to a bad power cable connection, but not because of an incorrect drive replacement, repair the connection and press **F2.**

-Or-

If this message was not due to a bad power cable connection, and no drive replacement took place, this could indicate noise on the data cable. Check cable for proper routing.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1789-Drive Not Responding, Physical Drive Check cables or replace physical drive *X*. Select "F1" to continue – drive array will remain disabled. Select "F2" to fail drive(s) that are not responding. Interim Recovery Mode will be enabled if configured for fault tolerance.	None	Cable or hard drive failure	1. Check the cable connections. 2. Replace the cables. 3. Replace the drive. If you do not want to replace the drive now, press **F2.**
1790-Disk 0 Configuration Error	None	Hard drive error or wrong drive type	Run the System Configuration Utility and Diagnostics and correct.
1791-Disk 1 Error	None	Hard drive error or wrong drive type	Run the System Configuration Utility and Diagnostics and correct.
1792-Drive Array Reports Valid Data Found in Array Accelerator. Data will automatically be written to drive array.	None	Indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Power was then restored within 8 to 10 days, and the data in the array accelerator was flushed to the drive array.	No data has been lost. Perform orderly system shutdowns to avoid data remaining in the array accelerator.
1793-Drive Array – Array Accelerator Battery Depleted – Data Lost (Error message 1794 also displays.)	None	Indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Array accelerator batteries failed. Power was not restored within 8 to 10 days. Data in array accelerator has been lost.	Perform orderly system shutdowns to avoid data remaining in the array accelerator.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1794-Drive Array – Array Accelerator Battery Charge Low. Array Accelerator is temporarily disabled. Array Accelerator will be re-enabled when battery reaches full charge.	None	A warning that the battery charge is below 75%. Posted-writes are disabled.	Replace the array accelerator board if batteries do not recharge while the system has been powered up for 36 hours.
1795-Drive Array – Array Accelerator Configuration Error. Data does not correspond to this drive array. Array Accelerator is temporarily disabled.	None	Indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. The data stored in the array accelerator does not correspond to this drive array.	Match the array accelerator to the correct drive array, or run the System Configuration Utility to clear the data in the array accelerator.
1796-Drive Array – Array Accelerator Not Responding. Array Accelerator is temporarily disabled.	None	Array accelerator is defective or has been removed.	1. Check that the array accelerator is properly seated. 2. Run the System Configuration Utility to reconfigure the Compaq IDA-2 without the array accelerator.
1797-Drive Array – Array Accelerator Read Error Occurred. Data in Array Accelerator has been lost. Array Accelerator is disabled.	None	Hard parity error while reading data from posted-writes memory.	Enable array accelerator.
1798-Drive Array – Array Accelerator Write Error Occurred. Array Accelerator is disabled	None	Hard parity error while writing data to posted-writes memory.	Enable array accelerator.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1799-Drive Array – Drive(s) Disabled due to Array Accelerator Data Loss. Select "F1" to continue with logical drives disabled. Select "F2" to accept data loss and to re-enable logical drives	None	Volume failed due to loss of data in posted-writes memory.	Press **F1** to continue with logical drives disabled or **F2** to accept data loss and re-enable logical drive.
Beeps only	2 long	No valid memory is present in the system.	Replace failed memory with valid memory.
Beeps only	2 long, 2 short	Power is cycled. Temperature too hot. Processor fan not installed or spinning.	Check fans.
(Run System Configuration Utility – F10 key)	None	A configuration error occurred during POST.	Press **F10** to run System Configuration Utility.
(RESUME – F1 key)	None	An indication to continue with the operation	Press **F1.**

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Diagnostics Software

The Test Error Codes tables include all test error codes generated by Compaq products. Eacb code has a corresponding description and recommended action or actions. Each system generates only those codes that apply to its configuration and options.

When you select Diagnostics and Utilities from the System Configuration Utility main menu, the utility prompts you to test, inspect, upgrade, and diagnose the server.

Diagnostics and Utilities are located on the system partition on the hard drive and must be accessed when a system configuration error is detected during the Power-On Self-Test (POST). Diagnostics software is also available on the SmartStart and Support Software CD. You can create a Diagnostics diskette from the SmartStart and Support Software CD and run Diagnostics from diskette. See the "Running the Utilities from Diskette" procedure earlier in this chapter.

The following options are available from the Diagnostics and Utilities menu:

- Test Computer
- Inspect Computer
- Upgrade Firmware
- Remote Utilities
- Diagnose Drive Array

Diagnostic error codes are generated when the Diagnostics software recognizes a problem. These error codes help identify possible defective subassemblies.

Steps for Diagnostics

In eacb case, the Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics utility to verify that the error condition has been corrected. If the error code is redisplayed:

1. Perform the next step listed in the table.
2. Run the Diagnostics utility program again.
3. Follow this procedure until the Diagnostics utility program no longer detects an error condition.

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100 – 199, Primary Processor Test Error Codes

The 100 series of diagnostic error codes identifies failures with processor and system board functions. Corrective action may require replacing the system boards or processor assemblies.

Table 3-3
Primary Processor Test Error Codes

Error Code	Description	Recommended Action
101-*XX*	CPU test failed.	Replace the processor board and retest.
103-*XX*	DMA page registers test failed.	Replace the processor board and retest.
104-*XX*	Interrupt controller master test failed.	
105-*XX*	Port 61 error.	
106-*XX*	Keyboard controller self-test failed.	
107-*XX*	CMOS RAM test failed.	1. Replace the battery/clock module and retest.
108-*XX*	CMOS interrupt test failed.	2. Replace the system board and retest.
109-*XX*	CMOS clock load data test failed.	
110-*XX*	Programmable timer load data test failed.	Replace the processor board and retest.
111-*XX*	Refresh detect test failed.	
112-*XX*	Speed test slow mode out of range.	
113-*XX*	Protected mode test failed.	
114-*XX*	Speaker test failed.	1. Verify the speaker connection and retest. 2. Replace the speaker and retest. 3. Replace the system board and retest.
116-*XX*	Cache test failed.	Replace the system board and retest.
122-*XX*	Multiprocessor dispatch test failed.	1. Check the system configuration and retest. 2. Replace the processor board and retest.
123-*XX*	Interprocessor communication test failed.	3. Replace the system board and retest.
199-*XX*	Installed devices test failed.	1. Check the system configuration and retest. 2. Verify cable connections and retest. 3. Check switch and/or jumper settings and retest. 4. Run the Configuration Utility and retest. 5. Replace the processor board and retest. 6. Replace the system board and retest.

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200 – 299, Memory Test Error Codes

The 200 series of diagnostic error codes identifies failures with the memory subsystem. Corrective action may require replacement of the memory expansion board, the memory modules, or the processor assembly.

Table 3-4
Memory Test Error Codes

Error Code	Description	Recommended Action
200-*XX*	Invalid memory configuration.	Reinsert memory modules in correct location and retest.
201-*XX* 202-*XX*	Memory machine ID test failed. Memory system ROM checksum failed.	1. Replace the system ROM and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
203-*XX* 204-*XX* 205-*XX* 206-*XX*	Memory write/read test failed. Memory address test failed. Walking I/O test failed. Increment pattern test failed.	1. Replace the memory module and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
207-*XX*	Invalid memory configuration—check DIMM installation. DIMMs installed have 8K refresh.	Replace DIMMs.
208-*XX*	Invalid memory speed detected—check DIMM installation. Slow DIMMs may cause data loss.	Replace with DIMMs faster than 60 ns.
210-*XX*	Random pattern test failed.	1. Replace the memory module and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.

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300 – 399, Keyboard Test Error Codes

The 300 series of diagnostic error codes identifies failures with keyboard and system board functions. Corrective action may require replacement of the keyboard or the system board assembly.

Table 3-5
Keyboard Test Error Codes

Error Code	Description	Recommended Action
301-*XX*	Keyboard short test, 8042 self-test failed.	1. Check the keyboard connection. If disconnected: power down the computer, reconnect the keyboard, power up the system, then retest. 2. Replace the keyboard and retest. 3. Replace the system board and retest.
302-*XX*	Keyboard long test failed.	
303-*XX*	Keyboard LED test, 8042 self-test failed.	
304-*XX*	Keyboard typematic test failed.	

400 – 499, Parallel Printer Test Error Codes

The 400 series of diagnostic error codes identifies failures with parallel printer interface board or system board functions. Corrective action may require replacement of the serial/parallel interface board or the system board assembly.

Table 3-6
Parallel Printer Test Error Codes

Error Code	Description	Recommended Action
401-*XX*	Printer failed or not connected.	1. Connect the printer and retest. 2. Check the power to the printer and retest. 3. Install the loopback connector and retest. 4. Check the switch on the serial/parallel interface board (if applicable) and retest. 5. Replace the serial/parallel interface board (if applicable) and retest. 6. Replace the system board and retest.
402-*XX*	Printer data register failed.	
403-*XX*	Printer pattern test failed.	
498-*XX*	Printer failed or not connected.	

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500 – 599, Graphics Display Unit Test Error Codes

The 500 series of diagnostic error codes identifies failures with graphics or system board functions. Corrective action may require replacement of the graphics board or the system board assembly.

Table 3-7
Graphics Display Unit Test Error Codes

Error Code	Description	Recommended Action
501-*XX*	Graphics controller test failed.	1. Replace the monitor and retest.
502-*XX*	Graphics memory test failed.	2. Replace the graphics board and retest.
503-*XX*	Graphics attribute test failed.	3. Replace the system board and retest.
504-*XX*	Graphics character set test failed.	
505-*XX*	Graphics 80x25-mode 9x14 character cell test failed.	
506-*XX*	Graphics 80x25-mode 8x8 character cell test failed.	
507-*XX*	Graphics 40x25-mode test failed.	
508-*XX*	Graphics 320x200-mode color set 0 test failed.	
509-*XX*	Graphics 320x200-mode color set 1 test failed.	
510-*XX*	Graphics 640x200-mode test failed.	
511-*XX*	Graphics screen memory page test failed.	
512-*XX*	Graphics gray-scale test failed.	
514-*XX*	Graphics white-screen test failed.	
516-*XX*	Graphics noise pattern test failed.	

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600 – 699, Diskette Drive Test Error Codes

The 600 series of diagnostic error codes identifies failures with the diskette, diskette drive, or system board functions. Corrective action may require replacement of the diskette drive or the system board assembly.

Table 3-8
Diskette Drive Test Error Codes

Error Code	Description	Recommended Action
600-*XX*	Diskette ID drive types test failed.	1. Replace the diskette and retest.
601-*XX*	Diskette format failed.	2. Check and/or replace the diskette power and signal cables, then retest.
602-*XX*	Diskette read test failed.	3. Replace the diskette drive and retest.
603-*XX*	Diskette write/read/compute test failed.	4. Replace the system board and retest.
604-*XX*	Diskette random seek test failed.	
605-*XX*	Diskette ID media failed.	
606-*XX*	Diskette speed test failed.	
607-*XX*	Diskette wrap test failed.	
608-*XX*	Diskette write protect test failed.	
609-*XX*	Diskette reset controller test failed.	
610-*XX*	Diskette change line test failed.	
694-*XX*	Pin 34 is not cut on 360-KB diskette drive.	
697-*XX*	Diskette type error.	
698-*XX*	Diskette drive speed not within limits.	
699-*XX*	Diskette drive/media ID error.	1. Replace the media and retest. 2. Run the Configuration Utility and retest.

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1100 – 1199, Serial Test Error Codes

The 1100 series of diagnostic error codes identifies failures with serial/parallel interface board or system board functions. Corrective action may require replacement of the serial/parallel interface board or the system board assembly.

Table 3-9
Serial Test Error Codes

Error Code	Description	Recommended Action
1101-*XX*	Serial port test failed.	1. Check the switch settings on the serial/parallel interface board (if applicable) and retest.
1109-*XX*	Clock register test failed.	2. Replace the serial/parallel interface board (if applicable) and retest.
		3. Replace the system board and retest.

1200 – 1299, Modem Communications Test Error Codes

The 1200 series of diagnostic error codes identifies failures with the modem. Corrective action may require replacement of the modem.

Table 3-10
Modem Communications Test Error Codes

Error Code	Description	Recommended Action
1201-*XX*	Modem internal loopback test failed.	1. Refer to the modem documentation for correct setup procedures and retest.
1202-*XX*	Modem timeout test failed.	2. Check the modem line and retest.
1203-*XX*	Modem external termination test failed.	3. Replace the modem and retest.
1204-*XX*	Modem auto originate test failed.	
1206-*XX*	Dial multifrequency tone test failed.	
1210-*XX*	Modem direct connect test failed.	

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1700 – 1799, Hard Drive Test Error Codes

The 1700 series of diagnostic error codes identifies failures with hard drives, hard drive controller boards, hard drive cables, and system board functions. If the system uses a drive array controller, see "Array Diagnostic Utility" later in this chapter.

Table 3-11
Hard Drive Test Error Codes

Error Code	Description	Recommended Action
1700-*XX*	Hard drive ID drive types test failed	1. Run the System Configuration Utility and verify the drive type.
1701-*XX*	Hard drive format test failed	2. Replace the hard drive signal and power cables, and retest.
1702-*XX*	Hard drive read test failed	3. Replace the hard drive controller and retest.
1703-*XX*	Hard drive write/read/compare test failed	4. Replace the hard drive and retest.
1704-*XX*	Hard drive random seek test failed	5. Replace the system board and retest.
1705-*XX*	Hard drive controller test failed	
1708-*XX*	Hard drive format bad track test failed	
1709-*XX*	Hard drive reset controller test failed	
1710-*XX*	Hard drive park head test failed.	
1715-*XX*	Hard drive head select test failed	
1716-*XX*	Hard drive conditional format test failed	
1717-*XX*	Hard drive (ECC *) test failed.	
1719-*XX*	Hard drive power mode test failed	
1736-*XX*	Drive monitoring failed.	
1799-*XX*	Invalid hard drive type failed	

* Error checking and correcting

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1900 – 1999, Tape Drive Test Error Codes

The 1900 series of diagnostic error codes identifies failures with tape cartridges, tape drives, tape drive cables, adapter boards, or the system board assembly.

Table 3-12
Tape Drive Test Error Codes

Error Code	Description	Recommended Action
1900-*XX*	Tape ID failed.	1. Replace the tape cartridge and retest.
1901-*XX*	Tape servo write failed.	2. Check and/or replace the signal cable and retest
1902-*XX*	Tape format failed.	3. Check the switch settings on the adapter board (if applicable).
1903-*XX*	Tape drive sensor test failed.	4. Replace the tape adapter board (if applicable) and retest.
1904-*XX*	Tape BOT/EOT test failed.	5. Replace the tape drive and retest.
1905-*XX*	Tape read test failed.	6. Replace the system board and retest.
1906-*XX*	Tape write/read/compare test failed.	

6000 – 6099, Compaq Network Interface Controller Test Error Codes

The 6000 series of diagnostic error codes identifies failures with Compaq Network Interface Controller (NIC).

Table 3-13
Compaq Network Interface Controller Boards Test Error Codes

Error Code	Description	Recommended Action
6000-*XX*	Network controller ID failed.	1. Check the controller installation in the EISA slot.
6001-*XX*	Network controller setup failed.	2. Check the interrupt type and number setting.
6002-*XX*	Network controller transmission failed.	3. Check the media connection at the controller and Multistation Access Unit (MAU).
6014-*XX*	Network controller configuration failed.	4. Check the media speed (4/16) and type of Unshielded Twisted Pair/Shielded Twisted Pair (UTP/STP) settings.
6016-*XX*	Network controller reset failed.	5. Check the MAU, cables, or other network components.
6028-*XX*	Network controller internal failed.	6. Replace the controller.
6029-*XX*	Network controller external failed.	
6089-*XX*	Network controller open failed.	
6090-*XX*	Network controller initialization failed.	
6091-*XX*	Network controller internal loopback failed.	
6092-*XX*	Network controller external loopback failed.	

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6500 – 6599, SCSI Hard Drive Test Error Codes

The 6500 series of diagnostic error codes identifies failures with SCSI hard drives, SCSI hard drive controller boards, SCSI hard drive cables, and system board functions. If the system uses a drive array controller, see "Array Diagnostic Utility " later in this chapter.

Table 3-14
SCSI Hard Drive Test Error Codes

Error Code	Description	Recommended Action
6500-*XX*	SCSI disk ID drive types test failed.	1. Run the System Configuration Utility and verify the drive type. 2. Replace the SCSI disk drive signal and power cables, then retest. 3. Replace the SCSI controller and retest. 4. Replace the SCSI disk drive and retest. 5. Replace the system board and retest.
6502-*XX*	SCSI disk unconditional format test failed.	
6505-*XX*	SCSI disk read test failed.	
6506-*XX*	SCSI disk SA/media test failed.	
6509-*XX*	SCSI disk erase tape test failed.	
6523-*XX*	SCSI disk random read test failed.	
6528-*XX*	Media load/unload test failed.	

6600 – 6699, SCSI/IDE CD-ROM Drive Test Error Codes

The 6600 series of diagnostic error codes identifies failures with the CD-ROM drive cables, CD-ROM drives, adapter boards, or the system board assembly.

Table 3-15
SCSI/IDE CD-ROM Drive Test Error Codes

Error Code	Description	Recommended Action
6600-*XX*	CD-ROM ID failed.	1. Replace the CD-ROM media and retest. 2. Check and/or replace the signal cable and retest. 3. Check the switch settings on the adapter board (if applicable). 4. Replace the SCSI controller (if applicable) and retest. 5. Replace the CD-ROM drive and retest. 6. Replace the system board and retest.
6605-*XX*	CD-ROM read failed.	

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6700 – 6799, SCSI Tape Drive Test Error Codes

The 6700 series of diagnostic error codes identifies failures with tape cartridges, tape drives, media changers, tape drive cables, adapter boards, or the system board assembly.

Table 3-16
SCSI Tape Drive Test Error Codes

Error Code	Description	Recommended Action
6700-*XX* 6706-*XX* 6709-*XX* 6728-*XX*	SCSI tape ID drive types test failed. SCSI disk SA/media test failed. SCSI disk erase tape test failed. Media load/unload test failed.	1. Run the System Configuration Utility and verify the drive type. 2. Replace the SCSI tape drive signal and power cables, then retest. 3. Replace the SCSI controller and retest. 4. Replace the SCSI tape drive and retest. 5. Replace the system board and retest.

8600 – 8699, Pointing Device Interface Test Error Codes

The 8600 series of diagnostic error codes identifies failures with the pointing device (mouse, trackball, and so on) or the system board assembly.

Table 3-17
Pointing Device Interface Test Error Codes

Error Code	Description	Recommended Action
8601-*XX*	Pointing device interface test failed.	1. Replace with a working pointing device and retest 2. Replace the system board and retest.

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Array Diagnostic Utility

The Array Diagnostic Utility (ADU) is a Windows-based software tool designed to run on all Compaq servers that support Compaq array controllers and are configured with SmartStart 4.10 or later. The two main functions of ADU are to collect all possible information about array controllers in the system and to generate a list of detected problems. The error messages and codes listed include all codes generated by Compaq products. The system generates only codes applicable to the configuration and options in the server.

ADU works by issuing multiple commands to the array controllers to determine if a problem exists. This data can then be saved to a file. In severe situations, this file can be sent to Compaq for analysis. In most cases, ADU provides enough information to initiate problem resolution immediately.

NOTE: ADU does not write to the drives, destroy data, or change or remove configuration information.

To start ADU:

1. Insert the SmartStart CD into the CD-ROM drive.
2. Restart the system from the SmartStart CD.
3. Select Array Diagnostic Utility (ADU) from the System Utilities menu.

   A "Please Wait" panel displays, indicating that the ADU is identifying the system parameters. ADU gathers information from all array controllers in the system. The time it takes to gather this information depends on the size of the system. When the information gathering process is complete, the ADU displays the main screen or a panel indicating any problems detected.

   CAUTION: Do not cycle the power during this process. The ADU must perform low-level operations that, if interrupted, could cause the controller to revert to a previous level of firmware if the firmware was soft-upgraded.

4. To generate an ADU report, select File, and then select Save Data from the Command menu.

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages

Message	Description	Recommended Action
Accelerator board not detected	Array controller did not detect a configured array accelerator board.	Install array accelerator board on array controller. If an array accelerator board is installed, check for proper seating on the array controller board.
Accelerator error log	List of the last 32 parity errors on transfers to or from memory on the array accelerator board. Displays starting memory address, transfer count, and operation (read and write).	If there are many parity errors, the array accelerator board may need to be replaced.
Accelerator parity read errors: *X*	Number of times that read memory parity errors were detected during transfers from memory on array accelerator board.	If there are many parity errors, the array accelerator board may need to be replaced.
Accelerator parity write errors: *X*	Number of times that write memory parity errors were detected during transfers to memory on the array accelerator board.	If there are many parity errors, the array accelerator board may need to be replaced.
Accelerator status. Cache was automatically configured during last controller reset	Can occur when cache board is replaced with one of a different size.	Normal operations should continue.
Accelerator status: Data in the cache was lost due to some reason other than the battery being discharged.	Data in cache was lost, but not because of the battery being discharged.	Check to be sure that the array accelerator is properly seated. If the error continues, the array accelerator may need to be replaced.
Accelerator status: Dirty data detected has reached limit. Cache still enabled, but writes no longer being posted.	The number of cache lines containing dirty data that cannot be flushed (written) to the drives has reached a preset limit. The cache is still enabled, but writes are no longer being posted. This problem usually occurs when there is a problem with the drive or drives.	Resolve the problem with the drive or drives, and then the controller can write the dirty data to the drives. Posted-writes operations are restored.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Accelerator status: Dirty data detected. Unable to write dirty data to drives	At least one cache line contains dirty data that the controller has been unable to flush (write) to the drives. This problem usually occurs when there is a problem with the drive or drives.	Resolve the problem with the drive or drives, and then the controller can write the dirty data to the drives.
Accelerator status. Excessive ECC errors detected in at least one cache line. As a result, at least one cache line is no longer in use.	At least one line in the cache is no longer in use due to excessive error checking and correcting (ECC) errors detected during use of the memory associated with that cache line.	Consider replacing the cache. If cache replacement is not done, the remaining cache lines should continue to operate properly.
Accelerator status: Excessive ECC errors detected in multiple cache lines. As a result, the cache is no longer in use.	The number of cache lines experiencing excessive ECC errors has reached a preset limit. Therefore, the cache has been shut down.	Try reseating the cache to the controller. If not successful, replace the cache.
Accelerator status: Obsolete data detected	During reset initialization, obsolete data was found in the cache. This was due to the drives being moved and written to by another controller.	Normal operations should continue. The controller either writes the data to the drives or discards the data completely.
Accelerator status. Obsolete data was discarded	During reset initialization, obsolete data was found in the cache, and was discarded (not written to the drives).	Normal operations should continue.
Accelerator status: Obsolete data was flushed (written) to drives	During reset initialization, obsolete data was found in the cache. The obsolete data was written to the drives, but newer data may have been overwritten.	If newer data was overwritten, you may need to restore newer data; otherwise, normal operation should continue.
Accelerator status: Permanently disabled	Array accelerator board has been permanently disabled. It remains disabled until it is reinitialized using the Array Configuration Utility (ACU).	Check the Disable Code field. Run the ACU to reinitialize the array accelerator board.
Accelerator status. Possible data loss in cache	Possible data loss detected during power up due to all batteries being below sufficient voltage level and no presence of the identification signatures on the array accelerator board.	There is no way to determine if dirty or bad data was in the cache and is now lost.
Accelerator status: Temporarily disabled	Array accelerator board has been temporarily disabled.	Check the Disable Code field.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Accelerator status: Unrecognized status	A status returned from the array accelerator board that ADU does not recognize.	Obtain the latest version of ADU.
Accelerator status: Valid data found at reset	Valid data was found in posted-write memory at reinitialization. Data is flushed to disk	Not an error or data loss condition. No action needs to be taken.
Accelerator status: Warranty alert	Catastrophic problem with array accelerator board. Refer to other messages on Diagnostics screen for exact meaning of this message.	Replace the array accelerator board.
Adapter/NVRAM ID mismatch	EISA nonvolatile RAM has an ID for a different controller from the one physically present in the slot	Run the server setup utility.
Array accelerator battery pack *X* not fully charged	Battery is not fully charged	If 75% of the batteries present are fully charged, the array accelerator is fully operational. If more than 75% of the batteries are **not** fully charged, allow 36 hours to recharge them.
Array accelerator battery pack *X* below reference voltage (recharging)	Battery pack on the array accelerator is below the required voltage levels.	Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.
Board in use by expand operation	Array accelerator memory is in use by an expand operation.	Operate the system without the array accelerator board until the expand operation completes.
Board not attached	An array controller is configured for use with array accelerator board, but one is not attached.	Attach array accelerator board to array controller.
Configuration signature is zero	ADU detected that nonvolatile RAM contains a configuration signature of zero. Old versions of the server setup utility could cause this.	Run the latest version of server setup utility to configure the controller and nonvolatile RAM.
Configuration signature mismatch	Array accelerator board configured for a different array controller board. Configuration signature on array accelerator board does not match the one stored on the array controller board.	To recognize the array accelerator board, run the Array Configuration Utility.
Controller communication failure occurred	Controller communication failure occurred.	ADU was unable to successfully issue commands to the controller in this slot.
Controller detected. NVRAM configuration not present	EISA nonvolatile RAM does not contain a configuration for this controller.	Run the server setup utility to configure the nonvolatile RAM.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Controller firmware needs upgrading	Controller firmware is below the latest recommended version.	Run Options ROMPaq Utility to upgrade the controller to the latest firmware revision.
Controller is located in special "video" slot	Controller is installed in slot for special video control signals. If controller is used in this slot, LED indicators on front panel may not function properly.	Install the controller in a different slot, and run the server setup utility to configure nonvolatile RAM. Then run Array Configuration Utility to configure the controller.
Controller is not configured	Controller is not configured. If controller was previously configured and you change drive locations, there may be a problem with placement of the drives. ADU examines each physical drive and looks for drives that have been moved to a different drive bay.	Look for messages indicating which drives have been moved. If none display and drive swapping did not occur, run the Array Configuration Utility to configure the controller and server setup utility to configure nonvolatile RAM. **Do not** run either utility if you believe drive swapping has occurred.
Controller reported POST error Error Code: *X*	The controller returned an error from its internal Power-On Self-Test (POST).	Replace the controller.
Controller restarted with a signature of zero	ADU did not find a valid configuration signature to use to get the data. Nonvolatile RAM may not be present (unconfigured) or the signature present in nonvolatile RAM may not match the signature on the controller.	Run the server setup utility to configure the controller and nonvolatile RAM.
Disable command issued	The issuing of the Accelerator Disable command has disabled posted-writes. This occurred because of an operating system device driver.	Restart the system. Run the Array Configuration Utility to reinitialize the array accelerator board.
Drive (bay) *X* firmware needs upgrading	Firmware on this physical drive is below the latest recommended version.	Run the Options ROMPaq Utility to upgrade the drive firmware to the latest revision.
Drive (bay) *X* has insufficient capacity for its configuration	Drive has insufficient capacity to be used in this logical drive configuration.	Replace this drive with a larger capacity drive.
Drive (bay) *X* has invalid M&P stamp	Physical drive has invalid monitor and performance data.	Run the server setup utility to properly initialize this drive.
Drive (bay) *X* has loose cable	The array controller could not communicate with this drive at power up. This drive has not previously failed.	Check all cable connections first. The cables could be bad, loose, or disconnected. Power up the system and attempt to reconnect data/power cable to the drive. If this does not work, replace the cable. If it is still unsuccessful, the drive may need to be replaced.
Drive (bay) *X* is a replacement drive	This drive has been replaced. This message displays if a drive is replaced in a fault tolerant logical volume.	If the replacement was intentional, allow the drive to rebuild.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Drive (bay) *X* is a replacement drive marked OK	This drive has been replaced and marked OK by the firmware. This may occur if a drive has an intermittent failure. For example, a drive has previously failed, then starts working again when ADU is run.	Replace the drive.
Drive (bay) *X* is failed	The indicated physical drive has failed.	Replace the drive.
Drive (bay) *X* is undergoing drive recovery	This drive is being rebuilt from the corresponding mirror or parity data.	Normal operations should occur.
Drive (bay) *X* needs replacing	The 210-MB hard drive has firmware version 2.30 or 2.31.	Replace the drive.
Drive (bay) *X* upload code not readable	An error occurred while ADU was trying to read the upload code information from this drive.	If there were multiple errors, the drive may need to be replaced.
Drive (bay) *X* was inadvertently replaced	The physical drive was incorrectly replaced after another drive failed.	1. Replace the drive that was incorrectly replaced. 2. Replace the original drive that failed. Do not run the server setup utility and try to reconfigure.
Drive Monitoring features are unobtainable	ADU is unable to receive monitor and performance data due to fatal command problem (such as drive time-out), or unable to receive data due to these features not being supported on the controller.	Check for other errors such as time-outs. If no other errors occur, upgrade the firmware to a version that supports the monitor and performance.
Drive Monitoring is NOT enabled for SCSI Port *X* Drive ID *Y*	The monitor and performance features have not been enabled on this drive.	Run the server setup utility to initialize the monitor and performance features.
Drive time-out occurred on physical drive bay *X*	ADU issued a command to a physical drive and the command was never acknowledged.	The drive or cable may be bad. Check the other error messages on the Diagnostics screen to determine resolution.
Drive *X* indicates position *Y*	Message indicates a designated physical drive, which shows it to be scrambled or in a drive bay other than the one for which it was originally configured.	Examine the graphical drive representation on ADU to determine proper drive locations. Remove drive *X* and place it in drive position *Y*. Rearrange the drives according to the ADU instructions.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Duplicate write memory error	Data could not be written to the array accelerator board in duplicate due to the detection of parity errors. This is not a data loss situation.	Replace the array accelerator board.
Error occurred reading RIS copy from SCSI Port *X* Drive ID	An error occurred while ADU was trying to read the reserve information sector (RIS) from this drive.	Compaq stores the hard drive configuration information in the reserve information sector. If there were multiple errors, the drive may need to be replaced.
FYI. Drive (bay) *X* is non-Compaq supplied	Compaq did not supply the installed drive.	If problems exist with this drive, replace it with a Compaq drive.
Identify controller data did not match with NVRAM	The controller identification data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. It could also occur if the firmware on the controller has been upgraded and the server setup utility was not run.	Run the INSPECT Utility to check the controller identification data. If the firmware version field is the only difference between the controller and nonvolatile RAM data, this is not a problem. Otherwise run the server setup utility.
Identify logical drive data did not match with NVRAM	The identify unit data from the array controller did not match with the information stored in nonvolatile RAM (NVRAM). This could occur if new, previously configured drives have been placed in a system that has also been previously configured.	Run the server setup utility to configure the controller and nonvolatile RAM.
Insufficient adapter resources	The adapter does not have sufficient resources to perform posted-write operations to the array accelerator board. Drive rebuild may be occurring.	Operate the system without the array accelerator board until the drive rebuild completes.
Inter-controller link connection could not be established	Unable to communicate over the link connecting the redundant controllers.	Make sure both controllers are using the same hardware and firmware revisions. If one controller failed, replace it.
Less than 75% batteries at sufficient voltage	The operation of the array accelerator board has been disabled due to less than 75% of the battery packs being at the sufficient voltage level.	Allow sufficient time for the batteries to recharge (36 hours). If the batteries have not recharged after 36 hours, replace the array accelerator board.
Less than 75% of batteries at sufficient voltage Battery pack *X* below reference voltage	Battery pack on the array accelerator is below the required voltage levels.	Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Logical drive *X* failed due to cache error	This logical drive failed due to a catastrophic cache error.	Replace the array accelerator board and reconfigure using the Array Configuration Utility
Logical Drive *X* status = Failed	This status could be issued for several reasons: ■ Logical drive is configured for No Fault Tolerance and one or more drives fail. ■ Mirroring is enabled, and any two mirrored drives fail. ■ Data Guarding is enabled, and two or more drives fail. ■ Another configured logical drive is in the WRONG DRIVE REPLACED or LOOSE CABLE DETECTED state.	Check for drive failures, wrong drive replaced, or loose cable messages. If there was a drive failure, replace the failed drive or drives, and then restore the data for this logical drive from the tape backup. Otherwise, follow the procedures for correcting problems when an incorrect drive is replaced or a loose cable is detected.
Logical Drive *X* status = Interim recovery (volume functional, but not fault tolerant)	A physical drive in this logical drive has failed. The logical drive is operational, but the loss of an additional drive causes permanent data loss.	Replace the failed drive as soon as possible.
Logical Drive *X* status = loose cable detected SOLUTION: Turn the system off and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s)	A physical drive or an external storage unit may have a cable or connection problem.	Power down the system and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s).
Logical Drive *X* status = Overheated	The temperature of the Intelligent Array Expansion System drive is beyond safe operating levels and has shut down to avoid damage.	Check the fans and the operating environment.
Logical Drive *X* status = Overheating	The temperature of the Intelligent Array Expansion System drive is beyond safe operating levels.	Check the fans and the operating environment.
Logical Drive *X* status = Recovering (rebuilding data on a replaced drive)	A physical drive in this logical drive has failed and has now been replaced. The replaced drive is rebuilding from the mirror drive or the parity data.	Nothing needs to be done. Although normal operations can resume, performance is less than optimal until the rebuild process is complete.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Logical Drive *X* status = Wrong drive replaced	A physical drive in this logical drive has failed. The incorrect drive was replaced.	Replace the drive that was incorrectly replaced. Then, replace the original drive that failed with a new drive. Do not run the server setup utility to reconfigure; you will lose data on the drive.
Loose cable detected— logical drives may be marked FAILED until corrected	ADU found a loose cable. The Smart Array Controller is unable to communicate with one or more physical drives. One or more logical drives may be marked FAILED, and are unusable until problem is corrected.	Power down the system. Check the cables for tight connection to the logical drives. Restart the system. If the same message occurs again, cables may be bad.
Loose cable detected— logical drives may be marked FAILED until corrected	Controller is unable to communicate with one or more physical drives, probably because of a cabling problem. Logical drives may be in a FAILED state until the condition is corrected, preventing access to data on the controller.	Check all controller and drive cable connections.
Mirror data miscompare	Data was found at reset initialization in the posted-write memory, however, the mirror data compare test failed resulting in that data being marked as invalid. Data loss is possible.	Replace the array accelerator board.
No configuration for array accelerator board	The array accelerator board has not been configured.	If the array accelerator board is present, run the Array Configuration Utility (ACU) to configure the board.
NVRAM configuration present, controller not detected	EISA nonvolatile RAM has a configuration for an array controller, but there is no board in this slot. Either a board has been removed from the system or a board has been placed in the wrong slot.	Place the array controller in the proper slot, or run the server setup utility to reconfigure nonvolatile RAM to reflect the removal or new position.
One or more drives is unable to support redundant controller operation	At least one drive in use does not support redundant controller operation.	Replace the drive that does not support redundant controller operation.
Other controller indicates different hardware model	The other controller in the redundant controller configuration is a different hardware model.	Make sure both controllers are using the same hardware model. If they are, make sure controllers are fully seated in their slots.
Other controller indicates different firmware version	The other controller in the redundant controller configuration is using a different firmware version.	Make sure both controllers are using the same firmware revision.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Other controller indicates different cache size	The other controller in the redundant controller configuration has a different size array accelerator.	Make sure both controllers are using the same capacity array accelerator
RIS copies between drives do not match	The drives on this controller contain copies of the RIS that do not match.	The hard drives in the array do not have matching configuration information. To remedy: 1. Resolve all other errors encountered. 2. Obtain the latest version of ADU, and then rerun ADU. 3. If unconfigured drives were added, configure these drives using the Array Configuration Utility (ACU). Once these drives are configured, the error should be resolved. 4. If drives or arrays were moved, make sure the movement adheres to the guidelines listed in the documentation for the array controller 5. If the error persists after completing steps 1-4, contact a Compaq authorized service provider.
SCSI port *X* Drive ID *Y* failed – REPLACE *(failure message)*	ADU detected a drive failure.	Correct the condition that caused the error, if possible, or replace the drive.
SCSI port *X*, Drive ID *Y* firmware needs upgrading	Firmware for the drive may cause problems and should be upgraded.	Run Options ROMPaq Utility to upgrade the drive's firmware to a later revision.
SCSI port *X*, Drive ID *Y* has exceeded threshold(s)	The monitor and performance threshold for this drive has been violated.	Verify and resolve the threshold that has been violated.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
SCSI port *X*, Drive ID *Y* is not stamped for monitoring	The drive has not been stamped with Monitor and Performance features.	To change without destroying the current configuration. 1. Run the Array Configuration Utility (ACU). 2. Change the array accelerator size and save the configuration. 3. Change the array accelerator back to the original size and save again. This should cause ACU to stamp the drive with monitoring and performance features.
SCSI port *X*, Drive ID *Y* may have a loose connection SOLUTION: Turn the system off and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s).	SMART is unable to communicate with the drive, because the cable is not securely connected, or the drive cage connection has failed.	1. Power down the system. 2. Reconnect the cable securely. 3. Restart the system. 4. If this does not solve the problem, replace the cables and connectors as needed.
SCSI port *X*, Drive ID *Y* RIS copies within this drive do not match	The copies of RIS on the drive do not match.	Check for other errors. The drive may need to be replaced.
SCSI port *X*, Drive ID *Y*. S.M.A.R.T. predictive failure errors have been detected in the factory Monitor and Performance data. SOLUTION: Please replace this drive when conditions permit.	A predictive failure warning for this hard drive has been generated indicating a drive failure is imminent.	Replace this drive at the earliest opportunity. See "Hot-Plug Hard Drives" in Chapter 2 prior to performing this operation.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
SCSI port *X*, Drive ID *Y* . S.M.A.R.T. predictive failure errors Have been detected in the power Monitor and Performance data. SOLUTION: Please replace this drive when conditions permit.	A predictive failure warning for this hard drive generates and indicates a drive failure is imminent.	Replace this drive at the earliest opportunity. See "Hot-Plug Hard Drives" in Chapter 2 prior to performing this operation.
SCSI port *X*, Drive ID *Y* was replaced on a good volume: (failure message)	ADU found this drive was replaced, although there was no problem with the volume.	No action needs to be taken.
Set configuration command issued	The configuration of the array controller has been updated. The array accelerator board may remain disabled until it is reinitialized.	Run the server setup utility to reinitialize the array accelerator board
Soft Firmware Upgrade required	ADU has determined that your controller is running firmware that has been soft-upgraded by the Compaq Upgrade Utility. However, the firmware running is not present on all drives. This could be caused by the addition of new drives in the system.	Run the Compaq Upgrade Utility to place the latest firmware on all drives.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Storage enclosure on SCSI bus *X* has a cabling error (bus disabled). SOLUTION: The SCSI controller has an internal and external cable attached to the same bus. Please disconnect the internal or external cable from the controller. If this controller supports multiple buses, the cable disconnected can be reattached to an available bus.	The current cable configuration is not supported.	Refer to your user documentation for cable guidelines and reconfigure as indicated.
Storage enclosure on SCSI bus *X* indicated a door alert. SOLUTION: Be sure that the storage enclosure door is closed or the side panel is properly installed.	The side panel of the external storage unit is open.	Make sure the side panel of the storage unit is securely closed.
Storage enclosure on SCSI bus *X* indicated a power supply failure. SOLUTION: Replace the power supply.	A power supply in the external storage unit has failed.	Replace the power supply.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Storage enclosure on SCSI bus *X* indicated an overheated condition. SOLUTION: Make sure all cooling fans are operating properly. Also be sure the operating environment of storage enclosure is within temperature specifications.	The external storage unit is generating a temperature alert.	1. Verify that all fans are attached and operating properly. 2. Make sure the operating environment of the storage unit is within specifications. 3. For better airflow, remove any dust buildup from fans or other areas. 4. Check your user documentation for allowable temperature specifications and additional tips. 5. If none of the above actions solve this problem, replace the fan.
Storage enclosure on SCSI bus *X* is unsupported with its current firmware version. SOLUTION: Upgrade the firmware version on the storage enclosure.	The firmware version of the external storage unit is not supported.	Upgrade the firmware.
Storage enclosure on SCSI bus *X* indicated that the fan failed. SOLUTION: Replace the fan.	The cooling fan located in the external storage unit has experienced a failure.	Replace the fan.
Storage enclosure on SCSI bus *X* indicated that the fan is degraded. SOLUTION: This condition usually occurs on enclosures with multiple fans and one of those fans has failed. Replace any fans not operating properly.	One or more fans in the external storage unit have failed.	Replace the failed fans.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Storage enclosure on SCSI bus *X* indicated that the fan module is unplugged. SOLUTION: Make sure the fan module is properly connected.	A fan in the external storage unit is not connected properly.	Check and reseat all fan connections securely.
Storage enclosure on SCSI bus *X* – Wide SCSI transfer failed. SOLUTION: This may indicate a bad SCSI cable on bus *X*. Try replacing the cable.	A cable on bus *X* has failed.	1. Replace the failed cable. 2. If that does not solve the problem, contact your Compaq authorized service provider.
Swapped cables or Configuration error detected. A configured array of drives was moved from another controller that supported more drives than this controller supports. SOLUTION: Upgrade the firmware on this controller. If this doesn't solve the problem, then power down system and move the drives back to the original controller.	You have exceeded the maximum number of drives supported for this controller and the attached controller was not part of the original array configuration.	1. Upgrade the firmware on this controller. 2. If the problem is not resolved: Replace this controller with the original controller -Or- Replace this controller with a new controller that supports the number of drives in the array.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Swapped cables or Configuration error detected. A drive rearrangement was attempted while an expand operation was running. This is an unsupported operation. SOLUTION: Power down system then move drives back to their original location. Power on system and wait for the expand operation to complete before attempting a drive rearrangement.	One or more drive locations were changed while an expand operation was in progress.	1. Power down the server. 2. Place the drives back in their original locations. 3. Restart the server, and complete the expand operation. 4. Move the drives to their new locations after the expand operation is completed.
Swapped cables or Configuration error detected. An unsupported drive arrangement was attempted. SOLUTION: Power down system then move drives back to their original location.	One or more physical drives were moved, causing a configuration that is not supported.	Move all drives back to their original locations, and refer to your user documentation for supported configurations.
Swapped cables or Configuration error detected. The cables appear to be interchanged. SOLUTION: Power down system then move the drives or cables back to their original location.	ADU has detected a change in the cable configuration. One or more cables may be attached to the incorrect bus. -Or- One or more drives have been moved to new locations.	Refer to your user documentation for supported configurations and cabling guidelines. Restore to the original configuration.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Swapped cables or Configuration error detected. The configuration information on the attached drives is not backward compatible with this controller's firmware SOLUTION: Upgrade the firmware on this controller. If this doesn't solve the problem then power down system then move drives back to the original controller.	The current firmware version on the controller cannot interpret the configuration information on the attached drives	Upgrade the firmware. -Or- If that does not solve the problem, move the drives back to the original controller.
Swapped cables or Configuration error detected. The maximum logical volume count *X* was exceeded during logical volume addition. All logical volumes beyond *X* have been lost and cannot be recovered SOLUTION: Identify the drives that contain the lost logical volumes Move those drives to another controller where the logical volumes can be recreated. NOTE! If a drive contains a valid logical volume and a lost logical volume, then do not move that drive to another controller.	More logical drives were created than are supported on this controller, causing lost logical drive volumes.	Identify the drives containing lost volumes, and move them to another controller so the lost volumes can be recreated. **WARNING:** Do not move a drive if it also contains valid volume data. This process causes all valid data to be destroyed!

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
System board is unable to identify which slots the controllers are in	Slot indicator on system board is not working correctly. Firmware recognizes both controllers as being installed in the same slot.	1. Make sure both controllers are fully seated in their slots. If the problem persists, this might indicate a controller problem or a system board problem. 2. Remove one of the controllers in the configuration and see if the remaining controller generates a Power-On Self-Test (POST) message. 3. Move the remaining controller to the other slot to see if it still generates a POST message. 4. Repeat these steps with the other controller. If both controllers give POST messages in one slot but not the other, it is a system board problem. If one of the controllers gives POST messages and the other controller does not, replace the controller that is giving the POST messages. Contact a Compaq authorized service provider for any warranty replacements.
The redundant controllers installed are not the same model. SOLUTION: Power down the system and verify that the redundant controllers are different models. If they are different models, replace the other controller with the same model as this one.	ADU detected two different controller models installed in a redundant controller configuration. This is not supported, and one or both controllers may not be operating properly.	Use the same controller models for redundant controller configurations.
This controller cannot see the drives but the other controller can	The other controller in the redundant controller configuration can recognize the drives, but this controller cannot.	Resolve any other errors and then rerun ADU.
This controller can see the drives but the other controller cannot	The other controller in the redundant controller configuration cannot recognize the drives, but this controller can.	Resolve any other errors and then rerun ADU.
Unable to communicate with drive on SCSI Port *X*, Drive ID *Y*	The array controller cannot communicate with the drive.	If the hard drive amber LED is on, replace the drive.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
Unable to retrieve identify controller data. Controller may be disabled or failed. SOLUTION: Power down the system. Verify that the controller is fully seated. Then power the system on and look for helpful error messages displayed by the controller. If this doesn't help, contact your COMPAQ service provider.	ADU requested the identify controller data from the controller but was unable to obtain it. This usually indicates that the controller is not seated properly or has failed.	1. Power down the server. 2. Verify the controller is fully seated. 3. Restart the server. 4. Resolve any error messages displayed by the controller. If this does not solve the problem, contact a Compaq authorized service provider.
Unknown disable code	A code was returned from the array accelerator board that ADU does not recognize.	Obtain the latest version of ADU.
Unrecoverable read error	Read parity errors were detected when attempting to read the same data from both sides of the mirrored memory. Data loss occurs.	Replace the array accelerator board.
Warning bit detected	A monitor and performance threshold violation may have occurred. The status of a logical drive may not be OK.	Check the other error messages for an indication of the problem.
WARNING – Drive Write Cache is enabled on *X*	Drive has its internal write cache enabled. The drive may be a third-party drive or the operating parameters of the drive may have been altered. Condition may cause data corruption if power to the drive is interrupted.	Replace the drive with a Compaq drive, or restore the operating parameter of the drive.

continued

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Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

Message	Description	Recommended Action
WARNING: Storage enclosure on SCSI bus *X* indicated it is operating in single ended mode. SOLUTION: This usually occurs when a single ended drive type is inserted into an enclosure with other drive types; and that makes the entire enclosure operate in single ended mode. To maximize performance replace the single ended mode drive with a type that matches the other drives.	One or more single-ended mode SCSI drives are installed in an external storage unit that operates in low voltage differential (LVD) mode.	The array is operational, but installing all LVD drives maximizes performance.
Write memory error	Data could not be written to the cache memory. This typically means that a parity error was detected while writing data to the cache. This could be caused by an incomplete connection between the cache and the controller. This is not a data loss circumstance.	With system powered down, verify that the cache board is fully connected to the controller.
Wrong Accelerator	This could mean that the board was replaced in the wrong slot or was placed in a system previously configured with another board type. Included with this message is a message indicating (1) the type of adapter sensed by ADU, and (2) the type of adapter last configured in EISA nonvolatile RAM.	Check the diagnosis screen for other error messages. Run the server setup utility to update the system configuration.

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Integrated Management Log

The Compaq Integrated Management Log (IML) replaces the Critical Error Log and Correctable Memory Logs. IML records system events and stores them in an easily viewable form. Each event is marked witb a time-stamp with one-minute granularity.

Events listed in the IML are categorized as one of four event severity levels:

- **Status**—indicates that the message is informational only.
- **Repaired**—indicates tbat corrective action bas been taken.
- **Caution**—indicates a nonfatal error condition.
- **Critical**—indicates a component failure.

The IML requires Compaq operating system-dependent drivers. Refer to the Support Software CD for instructions on installing the appropriate drivers.

Multiple Ways of Viewing the IML

You can view an event in the IML from within the:

- Compaq Insigbt Manager
- Compaq Survey Utility
- IML Management Utility

Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool used to monitor and control the operation of Compaq servers and clients. Compaq Insigbt Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insight Manager 4.0, the agents for Microsoft Windows NT and Novell NetWare are also Web-cnhanced; that is, these agents enable Web browser access and monitoring of management information.

The management agents monitor over 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to agent software. Agents act upon data by initiating information, such as statistics on network interface or storage subsystem performance.

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Viewing the Event List

1. From Compaq Insight Manager, select tbe appropriate server, and then select View Device Data. The selected server displays, with buttons around its perimeter.
2. Select the Recovery button, and then select the Integrated Management Log.
3. If a failed component bas been replaced, select the event from the list. Then select Mark Repaired for the failed component in the Insight Manager.

Printing the Event List

NOTE: You can only view the event list from the Recovery/Integrated Management Log screen as described above.

1. From the Compaq Insight Manager screen, select the appropriate server.
2. Select the Configuration button, then the Recovery button, and then Print.

Compaq Survey Utility

The Compaq Survey Utility is a serviceability tool available for Windows NT and NetWare. It delivers online-configuration capture and comparison to maximize server availability. It is delivered on the Compaq Management CD in the SmartStart package or is available on the Compaq website. Refer to the Compaq Management CD for information on installing and running the Compaq Survey Utility.

After running tbe Compaq Survey Utility, view the IML by loading the output of the utility (typically called "survey.txt") into a text viewer such as Microsoft Notepad. The event list follows the system slot information. After opening the text file, print it using the print feature of the viewer.

Compaq IML Management Utility

The Compaq IML Management Utility is a DOS-based tool that gives you the offline ability to review, mark corrected, and print events from the IML. It is located on the SmartStart and Support Software CD. Refer to the SmartStart Installation for Servers poster, which ships with the server, for information on bow to install and use the IML Management Utility.

OS IML Viewer

Windows NT and NetWare have OS-specific IML viewers that allow you to view the IML while tbe server is running and while you are at the server console.

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Event List

The Event List displays the affected components and the associated error messages. Though the same basic information displays, the format of the list may differ, depending on how you view it.

Event Messages

Table 3-19
Event Messages

Event Type	Event Message	Recommended Action
Machine Environment		
Fan Failure	System Fan Failure (Fan *X*, Location)	Replace fan.
Fan Inserted	System Fan Inserted (Fan *X*, Location)	None
Fan Removed	System Fan Removed (Fan *X*, Location)	None
Fans Not Redundant	System Fans Not Redundant	Add fan.
Overheat Condition	System Overheating (Zone *X*, Location)	Check fans.
Main Memory		
Correctable Error threshold exceeded	Corrected Memory Error threshold passed (Slot *X*, Memory Module *X*)	Replace the defective memory module.
	Corrected Memory Error threshold passed (System Memory)	Replace memory modules one at a time (if more than one) and retest the system after each replacement.
	Corrected Memory Error threshold passed (Memory Module unknown)	Replace the memory modules one at a time (if more than one).
Uncorrectable Error	Uncorrectable Memory Error (Slot *X*, Memory Module *X*)	Replace the defective memory module.
	Uncorrectable Memory Error (System Memory)	Replace the defective memory module.
	Uncorrectable Memory Error (Memory Module unknown)	Replace memory modules one at a time (if more than one) and retest the system after each replacement.

continued

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Table 3-19
Event Messages *continued*

Event Type	Event Message	Recommended Action
Processor		
Correctable Error Threshold exceeded	Processor Correctable Error Threshold passed (Slot *X*, Socket *X*)	Replace the processor.
Uncorrectable Error	Unrecoverable Host Bus Data Parity Error	Replace the processor.
Host Bus Error	Unrecoverable Host Bus Address Parity Error	Call the Compaq authorized service provider or Compaq technical support for diagnosis.
PCI Bus Error	PCI Bus Error (Slot *X*, Bus *X*, Device *X*, Function *X*)	Power down PCI slot and replace board.
Power Subsystem		
Power Supply Failure	System Power Supply Failure (Power Supply *X*)	Replace power supply.
Power Supply Inserted	System Power Supply Inserted (Power Supply *X*)	None
Power Supply Removed	System Power Supply Removed (Power Supply *X*)	None
Power Supply Not Redundant	System Power Supplies Not Redundant	Add power supply.
System Configuration Battery Low	Real-Time Clock Battery Failing	Replace battery.
AC Voltage Problem	System AC Power Problem (Power Supply *X*)	Check the input power voltage.
Power AC Overload	System AC Power Overload (Power Supply *X*)	■ Change the input power to 220 V. ■ Add an additional power supply, or replace with one able to supply present load. ■ Reduce the load.
Automatic Server Recovery–2		
System Stops Responding	ASR Lockup Detected: Cause	Call the Compaq authorized service provider or Compaq technical support for diagnosis.

continued

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Table 3-19
Event Messages *continued*

Event Type	Event Message	Recommended Action
Operating System		
System Stops Responding	Blue Screen Trap: Cause [NT] Kernel Panic: Cause [UNIX] Abnormal Program Termination: Cause [NetWare]	Refer to the documentation for the operating system.
Automatic OS Shutdown	Automatic Operating System Shutdown Initiated Due to Fan Failure Automatic Operating System Shutdown Initiated Due to Overheat Condition Fatal Exception (Number *X*, Cause)	Refer to the documentation for the operating system.

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Rapid Error Recovery

Compaq servers provide rapid recovery services for diagnosing and recovering from errors. These tools are available for local and remote diagnosis and recovery.

Rapid recovery means fast identification and resolution of complex faults. The Rapid Recovery Engine and Insight Management Agents notify the system administrator when a failure occurs, ensuring that the server experiences minimal downtime. You enable these features through the System Configuration Utility. These integrated server management features are:

- Automatic Server Recovery-2 (ASR-2)
- ASR-2 Integrated Management Log (IML) Messages
- Server Health Logs (on servers not supporting IMLs)
- Storage Fault Recovery Tracking
- Storage Automatic Reconstruction
- Network Interface Fault Recovery Tracking
- Memory Fault Recovery Tracking (with option upgrade kit)

These are discussed in more detail on the Server Documentation CD.

Automatic Server Recovery-2

Automatic Server Recovery-2 (ASR-2) allows the server to restart automatically from the operating system or the Compaq Utilities. To use this feature, you must use the System Configuration Utility to install Compaq Utilities in the system partition.

You can enable the ASR-2 feature to restart a server after a critical hardware or software error occurs. If a critical error occurs, the server records the error information in the IML, restarts the system, and then pages you. Using the System Configuration Utility, configure the system for automatic recovery or for attended local or remote access to diagnostic and configuration tools.

NOTE: ASR-2 is only available on operating systems using the ASR-2 drivers provided by Compaq.

You can also configure ASR-2 to page an administrator when the system restarts. ASR-2 depends on the application and driver that routinely notify the ASR-2 hardware of proper system operations. If the time between ASR-2 notifications exceeds the specified period, ASR-2 assumes a fault has occurred and initiates the recovery process.

To configure ASR-2:

1. Run the System Configuration Utility.
2. Select View, then Edit Details.
3. Set the software error recovery status to Enabled.
4. Set the software error recovery timeout.

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The available recovery features are:

- **Software Error Recovery**—automatically restarts the server after a software-induced server failure
- **Environmental Recovery**—allows the server to restart when temperature, fan, or AC power conditions return to normal

Unattended Recovery

For unattended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present, and you selected Paging)
- Tries to restart the operating system

Often the server restarts successfully, making unattended recovery the ideal choice for remote locations where trained service personnel are not immediately available.

If ASR-2 cannot restart the server within 10 attempts, it places a critical error message in the IML, starts the server into Compaq Utilities, and enables remote access (if you configured remote access).

To use this level of ASR-2, you must configure ASR-2 to load the operating system after restart.

Attended Recovery

For attended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present, and you selected Paging)
- Starts Compaq Utilities from the hard drive
- Enables remote access

During system configuration, these utilities are placed on the system utilities partition of the hard drive.

If you have configured for Dial-In access and have a modem with an auto-answer feature installed, you can dial in and remotely diagnose or reconfigure the server.

If you have configured the Compaq Utilities for network access, you can access the utilities over the network. You can use Compaq Insight Manager for dial-in or network access.

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Hardware Requirements

To use this level of ASR-2 over a modem, you need the following:

- A third-party PCI or optional Hayes modem
- System Configuration Utility and Diagnostics Utility installed on the system partition of the hard drive
- ASR-2 configured to load Compaq Utilities after restart

Remote Operations

To run Compaq Utilities remotely over an IPX using the Network feature, you need Compaq Insight Manager 2.0 or later or an NVT (Novell Virtual Terminal) Terminal Emulator with VT100 or ANSI terminal capabilities.

To run Compaq Utilities remotely over an IP network, you need Compaq Insight Manager 2.10 or later or a Telnet Terminal Emulator with VT100 or ANSI capabilities. If you are notified that ASR-2 restarted the server and you have restarted to Compaq Utilities, use the INSPECT Utility or Compaq Insight Manager to view the critical error in the Critical Error Log. Run Diagnostics to diagnose and resolve the problem.

Automatic Server Recovery (ASR-2)–Other Uses

You can configure ASR-2 to restart the server into Compaq Utilities to diagnose the critical error or to start the operating system to return the server to operational status as rapidly as possible.

When you enable ASR-2 to start the operating system, tbe server tries to start from the primary partition. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access Compaq Utilities.

When you enable ASR-2 to start Compaq Utilities, the server restarts after a critical error and loads Compaq Utilities from the system partition onto the hard drive.

Starting Compaq Utilities

You can configure the server to start Compaq Utilities in four different ways:

- Without remote console support; for example, to run Compaq Utilities from the server console only
- With remote console support using modems for dial-in access
- With remote console support using a modem to dial a predetermined telephone number
- With remote console support through a network connection (IP or IPX)

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Table 3-20
Automatic Server Recovery-2 (ASR-2) Features

Features	Definition
Software error recovery	When enabled, ASR-2 is activated if the operating system hangs or stops responding, resulting in a lockup.
Software error recovery timeout	Determines how long the server waits before enabling ASR-2 after an operating system lockup.
Standby recovery server option	When enabled, ASR-2 activation initiates a switch to a designated standby recovery server.
Standby recovery server port	Port used to communicate with the recovery server.
Standby recovery time-out	Determines how long the server waits to initiate a switch to a designated standby recovery server after ASR-2 activation.
Software error recovery boot option	Allows the server to restart, either initiating the operating system or Compaq Utilities.
Thermal shutdown	When enabled, shuts down the server if a critical thermal error occurs.
UPS shutdown	When enabled, allows the server to perform a shutdown if an uninterruptible power supply (UPS) is activated.
UPS shutdown threshold	Determines how long the server waits to shut down after the UPS is activated. If desired, this setting should provide enough time for an administrator to perform any necessary operations or to properly shut down the server.

Compaq Integrated Remote Console

The standard Compaq Integrated Remote Console performs a wide range of configuration activities. Console features include:

- Is accessible using ANSI terminal
- Operates independently of the operating system
- Provides for remote server restart
- Provides access to system configuration
- Uses out-of-band communication with dedicated management modem installed in the server

For more information, see the *Integrated Remote Console User Guide* that shipped with the server.

IMPORTANT: Before configuring ASR-2, verify that the System Configuration Utility and Diagnostics software are installed on the system partition. ASR-2 must have this software to start Compaq Utilities after a system restart. Compaq recommends verifying that the System Configuration Utility and the Diagnostics software is installed even if you configure ASR-2 to start the operating system.

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Compaq Health Driver

The Compaq Health Driver continually resets the ASR-2 timer according to the frequency specified in the System Configuration Utility (for example, 10 minutes). If the ASR-2 timer counts down to zero before being reset, due to an operating system or a server lockup, ASR-2 restarts the server into either Compaq Utilities or the operating system (as indicated by the System Configuration parameters). The default value is 10 minutes. The allowable settings are 5, 10, 20, and 30 minutes.

For remote and offsite (unattended) servers, setting the software error recovery timeout for 5 minutes reduces server downtime and allows the server to recover quickly. For local (attended) servers located onsite, you can set the software error recovery timeout for 20 or 30 minutes, giving you time to arrive at the server if you wish to manually diagnose the problem.

The Compaq Health Driver is independent of the ASR-2 timer. Load the health driver and enable the ASR-2 timer. Enabling the ASR-2 timer allows the driver to detect and log information into the IML regarding numerous hardware and software errors. However, you cannot enable the ASR-2 timer without loading the Compaq Health Driver.

Before ASR-2 restarts the server, it records any information available about the condition of the operating system in the Critical Error Log or the IML depending on the server support. This information can he used to diagnose an operating system crash or server lockup, while still allowing the server to be restarted.

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The following ASR-2 flowchart shows the sequence of events after a hardware or software error occurs:

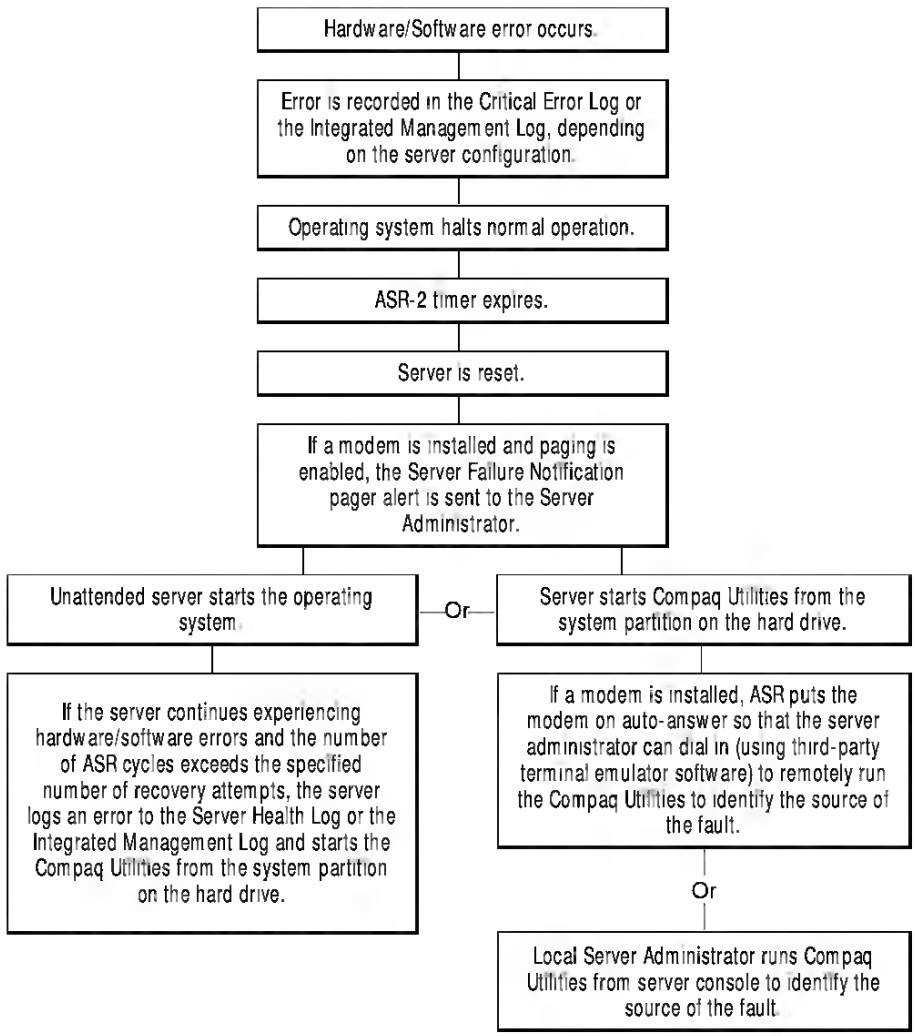
Hardware/Software error occurs.
Error is recorded in the Critical Error Log or the Integrated Management Log, depending on the server configuration.
Operating system halts normal operation.
ASR-2 timer expires.
Server is reset.
If a modem is installed and paging is enabled, the Server Failure Notification pager alert is sent to the Server Administrator.
Unattended server starts the operating system.
Or
Server starts Compaq Utilities from the system partition on the hard drive.
If the server continues experiencing hardware/software errors and the number of ASR cycles exceeds the specified number of recovery attempts, the server logs an error to the Server Health Log or the Integrated Management Log and starts the Compaq Utilities from the system partition on the hard drive.
If a modem is installed, ASR puts the modem on auto-answer so that the server administrator can dial in (using third-party terminal emulator software) to remotely run the Compaq Utilities to identify the source of the fault.
Or
Local Server Administrator runs Compaq Utilities from server console to identify the source of the fault.

Figure 3-1. ASR-2 flowchart

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Initializing Compaq Utilities

When you enable ASR-2 to start into Compaq Utilities and a critical error occurs, the operating system-specific Health Driver logs the error information into the Critical Error Log or the IML and the ASR-2 feature restarts the server. When the system reinitializes, the system pages the designated administrator (if enabled), and starts Compaq Utilities from the hard drive.

If Dial-In status is enabled, the modem is placed in auto-answer mode. If you enable Dial-Out status, you are automatically enabled for Dial-In.

If Network Status is enabled, the appropriate network support software is loaded, depending on the network protocol, IP or IPX. Having the appropriate network software allows remote access via the network.

IMPORTANT: Compaq Utilities are loaded from a specially created system partition on the hard drive. This partition was configured during server configuration.

You can access the server and view the Server Health Logs (in servers not supporting the IML) remotely by modem, in-band over the network, or directly from the server. For modem access, you must have either Compaq Insight Manager 2.0 or above, or have a VT100 or ANSI terminal type device. You may use a standard CRT with VT100 or ANSI emulation capability, or you may use a PC with a VT100 or ANSI terminal emulation package. The communication parameters must be set for 8 data bits, no parity, and 1 stop bit.

You can also enable ASR-2 to allow network access using the Network Status feature in the System Configuration Utility. You must have either Compaq Insight Manager 2.0 or greater or a Novell Virtual Terminal (NVT) emulator on an IPX network to use this feature. You must also have System Configuration Utility version 2.24 or later. For IP access, you must have Compaq Insight Manager 2.10 or later, or a Telnet Terminal emulator to use this feature. You also must have version System Configuration Utility 2.24 or later.

The System Configuration Utility settings should resemble the settings in Table 3-21 when you enable ASR-2 to start into Compaq Utilities.

Table 3-21
Compaq System Configuration Utility Pager Settings for Starting into Compaq Utilities

Pager Data	Setting	Description
Pager status	Enabled	Indicates whether the pager feature is enabled or disabled.
Pager dial string	ATDT 555-5555	Indicates the pager dial string and delay before the pager message; pagers typically use one of the following formats: Local pagers: ATDT 555-5555 Wide area pagers: ATDT 1-800-555-5555,1234567#
Pager message	1234567#	Represents a unique number (maximum seven digits, numeric only) that you must designate to identify the server on the pager display. The ROM adds a three-digit code to the front of this number. The first two digits indicate the subsystem and the third digit indicates the severity of the error that caused the alert. The # symbol usually terminates the message. If no message is required, delete the # symbol.

continued

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Table 3-21
Compaq System Configuration Utility Pager Settings for Starting into Compaq Utilities *continued*

Pager Data	Setting	Description
Pager test	Select to test pager setup	Use this to test the current pager settings. Press **Enter** to dial the pager number, and the pager message (if present) displays. You must configure the computer before testing the pager, and the Pager Status must be set to Enabled. Do not test the pager if you are running remotely and are using only one modem.
Serial interface	COM1	Select the communications port for the modem used by the pager and the remote ASR-2 functions. The options are COM1 and COM2.
Dial-In status	Enabled	Set Dial-In Status to Enabled. Be sure the Reset Boot option is set to Boot Compaq Utilities. When the system starts because of an ASR-2 reset, it starts to the Compaq Utilities, sets the Management Modem to auto-answer, and waits for the administrator to dial in and run the Compaq Utilities. You automatically disable this option when you configure the software error recovery start option to Boot Operating System. When ASR-2 pages you, you cannot dial in unless ASR-2 exceeds 10, the threshold number of server restart retries. When this happens, ASR-2 restarts the server into the Compaq Utilities and places the modem in auto-answer mode.
Dial-Out status	Enabled	Allows ASR-2 to dial out to a remote workstation. If you selected this option, Dial-In Status is automatically selected. To use the Dial-Out feature, set Dial-Out Status to Enabled and set the Dial-Out String to the correct telephone number. You must also set the Reset Boot option to Boot Compaq Utilities. When the system restarts because of an ASR-2 reset, the administrator is paged via Pager Status and Pager Dial String, the system restarts to the Compaq Utilities, and dials out to the phone number provided in the Dial-Out string. The dial-out number is tried five times. If it fails to connect after five attempts, the modem is put in auto-answer mode.
Dial-Out string	555-1234	Enter the dial string followed by the remote computer telephone number.
Network status	Enabled	To allow network access to Compaq Utilities, set Network Status to Enabled and ensure that the Reset Boot option is set to Boot Compaq Utilities.
Network protocol		To use IPX network access, set Network Protocol to IPX. When the system restarts to the Compaq Utilities because of an ASR-2 reset, it loads IPX network support. This enables remote access using NVT. To use IP network access, set Network protocol to IP. Also make sure to set Network IP address, Network IP net mask, and Network IP router address. When the system restarts to the Compaq Utilities because of an ASR-2 reset, it loads IP network support. This enables remote access using Telnet. **Note:** The Network Status must be set to Enabled for network access.
Network controller	Compaq	For all Compaq standard network controllers.

continued

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Table 3-21
Compaq System Configuration Utility Pager Settings for Starting into Compaq Utilities *continued*

Pager Data	Setting	Description
Network host name	CPQHOU	Enter the network name of the server. Use underscores instead of spaces within the name— for example, Compaq_Server. If you are using IPX network access to the Compaq Utilities, this server name is used to advertise NVT host services. This server name displays in the Compaq Insight Manager server list when the program determines it can communicate using NVT. Set this name to be the same as the server name you assign when the host OS is running.
Network Interface Controller (NIC) slot	Slot #	Select the slot number of the NIC you wish to use for network access to Compaq Utilities.
Network frame type	ETHERNET_II	Select the frame type for the network. Selections include both Ethernet and Token-Ring topologies.
Network IP address		Enter the IP address for this server in standard dot notation. **Note:** This is not used if you select Custom for Network controller. You must enter the IP address into the NET.CFG file that you load into the system partition.
Network IP net mask		Enter the net mask for this server in standard dot notation. **Note:** This is not used if you select Custom for network controller. You must enter the IP address into the NET.CFG file that you load into the system partition.
Network IP router address		Enter the router to be used for this server in standard dot notation. **Note:** This is not used if you select Custom for network controller. You must enter the IP address into the NET.CFG file that you load into the system partition.

If you configure the server to restart, and then access the Compaq Utilities menu, it prepares for remote communications. You can run Compaq Diagnostics, INSPECT, or the server-setup utility remotely by using a workstation running terminal emulation software, such as Compaq Insight Manager.

Initializing the Operating System

When you enable ASR-2 to restart into the operating system and a critical error occurs, ASR-2 logs the error into the Critical Error Log or IML, and restarts the server. The system ROM pages the designated administrator, then executes the normal restart process.

IMPORTANT: When you enable ASR-2 to restart into the operating system, Modem Dial-In Status, Network Status, and Modem Dial-Out Status are automatically disabled. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access the server, and the server cannot dial out to a remote workstation.

If the ASR-2 feature cannot restart the server within 10 attempts, it logs a critical error into the Critical Error Log or IML restarts the server into the Compaq Utilities, and puts the modem into auto-answer mode.

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The System Configuration Utility setting should resemble the settings in Table 3-22 when you enable ASR-2 to restart into the operating system:

Table 3-22
Operating System Restart SCU Setting for ASR-2

Option	Setting
Serial interface	COM1
Dial-In status	Disabled
Dial-Out status	Disabled
Dial-Out string	555-1234
Network status	Disabled
Network protocol	IPX
Network interface controller	Compaq
Network host name	CPQHOU
Network controller slot	Slot #
Network frame type	ETHERNET_II
Network IP address	xxx.xxx.xxx.xxx
Network IP net mask	xxx.xxx.xxx.xxx
Network IP router address	xxx.xxx.xxx.xxx

ASR-2 Security

The standard Compaq password features function differently during ASR-2 than during a typical system startup. During ASR-2, the system does not prompt for the power on password. Not prompting a power on password allows ASR-2 to restart the operating system or Compaq Utilities without user intervention.

To maintain system security, set the server to start in Network Server Mode (an option in the System Configuration Utility). This option ensures that the server keyboard is locked until you enter the keyboard password.

Select an administrator password (an option in the System Configuration Utility). During attended ASR-2 (local or remote), you must enter this administrator password before any modifications can be made to the server configuration.

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Server Health Logs

In some servers, Server Health Logs are replaced by the IML, if it is supported. Server Healtb Logs contain information to help identify and correct any server failures and correlate hardware changes with server failure. Server Health Logs are stored in nonvolatile RAM and consist of the Critical Error Log and the Revision History Table.

If errors occur, information about the errors is automatically stored in tbe Critical Error Log.

Whenever boards or components (that support revision tracking) are updated to a new revision, the Revision History Table is updated.

ASR-2 IML Messages

The IML, or Critical Error Log for Server Health Log, records memory errors, catastrophic hardware errors, and software errors that causes system failures. This information helps to quickly identify and correct the problem, thus minimizing downtime.

You can view the IML or Critical Error Log, through Compaq Insight Manager. Tbe Diagnostics Utility either resolves the error or suggests corrective action in systems that do not support event logs.

The IML or Critical Error Log, identifies and records all the errors identified in Table 3-23.

Table 3-23
ASR-2 IML or Critical Error Log Messages

Message	Description
Abnormal Program Termination	The operating system encountered an abnormal situation that caused a system failure.
ASR-2 detected by ROM	An ASR-2 activity was detected and logged by the system ROM.
ASR-2 Test Event	The System Configuration Utility generated a test alert.
Automatic Server Recovery Base Memory Parity Error	The system detected a data error in base memory following a reset due to the ASR-2 timer expiration.
Automatic Server Recovery Extended Memory Parity Error	The system detected a data error in extended memory following a reset due to the ASR-2 timer expiration.
Automatic Server Recovery Memory Parity Error	The system ROM was unable to allocate enough memory to create a stack. Then, it was unable to put a message on the screen or continue starting the server.
Automatic Server Recovery Reset Limit Reached	The maximum number of system resets due to ASR-2 timer expiration was reached, resulting in the loading of Compaq Utilities.

continued

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Table 3-23
ASR-2 IML or Critical Error Log Messages *continued*

Message	Description
Battery Failing	Low system battery warning. Replace battery within 7 days to prevent loss of nonvolatile configuration memory. Failure of the battery supporting the system nonvolatile RAM is imminent.
Caution: Temperature Exceeded	The operating system detected that the temperature of the system exceeded the caution level. Accompanying data in the log notes if an auto-shutdown sequence was invoked by the operating system.
Diagnostic Error	An error was detected by the Diagnostics Utility. See the specific error code in this chapter for a detailed explanation.
Error Detected On Boot Up	The server detected an error during the Power-On Self-Test (POST).
NMI – Automatic Server Recovery Timer Expiration	The operating system received notice of an impending ASR-2 timer expiration.
NMI – Expansion Board Error	A board on the expansion bus indicated an error condition, resulting in a server failure.
NMI – Expansion Bus Master Timeout	A bus master expansion board in the indicated slot did not release the bus after its maximum time, resulting in a server failure.
NMI – Expansion Bus Slave Timeout	A board on the expansion bus delayed a bus cycle beyond the maximum time, resulting in a server failure.
NMI – Fail-Safe Timer Expiration	Software was unable to reset the system fail-safe timer, resulting in a server failure.
NMI – PCI Bus Parity Error	A parity error was detected on the PCI bus.
NMI – Processor Parity Error	The processor detected a data error, resulting in a server failure.
NMI – Software Generated Interrupt Detected Error	Software indicated a system error, resulting in a server failure.
Processor Exception	The indicated processor exception occurred.
Processor Prefailure	A CPU passed an internal corrected error threshold; excessive internal ECC cache errors.
Required System Fan Failure	The required system fan failed. Accompanying data in the log notes if an auto-shutdown sequence was invoked by the operating system.
Server Manager Failure	An error occurred with the Server Manager/R board.
UPS AC Line Failure Shutdown or Battery Low	The UPS notified the operating system that the AC power line failed. Accompanying data indicates an auto-shutdown sequence was invoked or the battery was nearly depleted.

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Revision History Table

Some errors can be resolved by reviewing changes to the server configuration. The server has an Automatic Revision Tracking (ART) feature that helps you review recent changes to the server configuration.

One ART feature is the Revision History Table, which contains the hardware version number of the system board and any other system boards providing ART-compatible revision information. This feature allows you to determine the level of functionality of an assembly in a system without opening or powering down the unit.

Table 3-24
Revision History Table

Current Revisions	
Date	10/31/98
System board revision	03
Assembly version	1
Functional revision level	C
Processor 01 revision	01
Assembly version	1
Functional revision level	A
Previous Revisions	
Date	9/21/98
System board revision	03
Assembly version	1
Functional revision level	C
Processor 01 revision	01
Assembly version	1
Functional revision level	A

The Revision History Table is stored in nonvolatile RAM and is accessed through the INSPECT Utility and Compaq Insight Manager.

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Storage Fault Recovery Tracking

This feature tracks over 12 failure-indication parameters, such as timeouts, spin-up errors, and self-test errors of SCSI drives. You can use these parameters to pinpoint failed storage subsystem components and to recover from controller or hard drive failure.

Storage Automatic Reconstruction

This feature automatically reconstructs data to an online spare or to a replaced drive if a drive fails. To use the reconstruction feature, you must configure the server for drive mirroring or data guarding. The reconstruction decreases system downtime by allowing rapid recovery to full system operation if a drive fails.

Network Interface Fault Recovery Tracking

This feature tracks over 20 failure indication parameters, such as alignment errors, lost frames, and frame copy errors of Ethernet and Token-Ring network interfaces. It decreases network downtime by enabling diagnosis of actual network interface failures.

Memory Fault Recovery Tracking

This feature inspects the operation of the memory subsystem looking for uncorrectable memory errors.

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Remote Management Features

Compaq servers have the following management features that you can access through a modem or a network:

Table 3-25
Compaq Servers Remote Management Features

Feature	Description
Service Session	Provides remote access to all the utilities on the system partition, including Diagnostics utilities, INSPECT, ROMPaq, Drive Array Advanced Diagnostics (DAAD), and the System Configuration Utility. Also provides the capability for remote file transfer services to and from the system partition.
Disk-Based Diagnostics	Provides remote diagnostic capability after you configure ASR-2 and the reset restart option to restart from Compaq Utilities. Also allows you to view Health Logs. Disk-based diagnostics can also be run locally. Press **F10** during the restart process when the cursor moves to the upper-right corner of the monitor.
Server Restart	Provides the ability to restart the server remotely from Compaq Insight Manager while the operating system is running. Allows the server to restart back to the operating system or restart to the system partition. Provides a complete system reset to all peripherals. If you select Boot to Compaq Utilities from Compaq Insight Manager, Compaq Utilities loads the appropriate remote services so that remote access is available. If network status is enabled, network support is loaded. If Dial-In status is enabled, the modem is set to auto-answer.
Configuration Utility	Allows you to run the remote System Configuration Utility locally. Press **F10** during the restart process when the cursor moves to the upper-right corner of the monitor.
Firmware Updates	Allows you to update the server firmware remotely. Uses firmware images on the system partition that might have been previously uploaded with the file transfer services.

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ROMPaq Error Recovery Options

From time to time it may be desirable to upgrade the current system ROM. Some reasons for this may be as follows:

- Customer desires ROM upgrade
- Obtained new SmartStart CD-ROM
- Desire to upgrade server processors
- Request from Compaq

The process of upgrading the system ROM is referred to as flashing the ROM. Flashing consists of using software to replace the current ROM image witb a new one through ROMPaq.

Should an error such as a power failure occur during this process, the flash operation is not completed, causing the ROM image in the server to be corrupted. Compaq provides two options for ROMPaq recovery, depending on the server and circumstances involved.

ROMPaq Disaster Recovery

If a server does not have a valid ROM image, perform the following process:

IMPORTANT: This operation should be performed on a server with redundant ROM **ONLY IF** both ROM images have been corrupted. If only one image is corrupted, read the section following, "Redundant ROM Image Recovery" for complete instructions.

---

1. Create a new ROMPaq diskette, using the latest version for the server involved.

IMPORTANT: If the ROM is corrupted by a ROMPaq interruption, the initial ROMPaq attempt may have affected the contents of the original diskette.

---

2. Power down the server.
3. Activate disaster recovery mode by setting the configuration switches on the system maintenance switch block.

IMPORTANT: These switch settings are different for each server. Refer to the switch setting information contained in the user documentation provided for your server to find these settings for your server.

Make a note of the positions of all switches in this switch box, so they may be restored after successful completion of this process.

4. Insert the ROMPaq diskette.

   Although you utilize a standard ROMPaq diskette, the old ROM image is not saved during this process.

5. Power up the server.

   The keyboard, mouse, and monitor are all inactive. The server generates two long beeps to indicate you are in Disaster Recovery Mode.

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6. The server analyzes the diskette, searching for the latest ROM image. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.
7. The ROMPaq diskette flashes the system ROM.
8. At the successful completion of tbis process, a sequence of audible ascending beeps is generated.
9. After successful completion of this process, follow these steps:
   a. Power down the server.
   b. Reset configuration switches.
   c. Power up the server as usual.

–Or–

After a failed ROMPaq upgrade procedure, power down the server and repeat the above process.

IMPORTANT: If you are performing this procedure on a server with redundant ROM, and both ROM images have been corrupted, repeat the process in succession (once for each corrupted image). If only one image is corrupted, read the following section, "Redundant ROM Image Recovery" for complete instructions.

Redundant ROM Image Recovery

If power is interrupted during the flash process, a server with redundant ROM powers up as usual, but the inactive (redundant) ROM image is corrupted.

A POST error message displays:

105 – Current System ROM is corrupt – now booting redundant System ROM.

In this instance, you are required to flash again so tbat the invalid image is now valid. After you flash the invalid image, the system boots to that image—which was the original objective.

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Compaq Insight Manager

Compaq Insigbt Manager is a comprebensive management tool to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insight Manager 4.0, the agents for Windows NT and NetWare are also Web-enabled; that is, these agents enable Web browser access and monitoring of management information.

The management agents monitor more than 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to the agent software. The agents act upon that data by initiating information sucb as network interface or storage subsystem performance statistics.

Features of Compaq Insight Manager

Compaq Insight Manager includes the following:

- Web browser access to Insight Manager Device and Configuration information is available anywhere you bave network access and a standard Web browser for Windows and NetWare servers.
- Comprehensive fault management allows proactive management of the distributed enterprise by alerting you in advance of potential system failures.
- Windows NT monitoring capability allows faster determination of the root cause of system and application faults by being able to quickly determine whether hardware or software causes an event.
- Broad configuration management provides effective deployment and maintenance of consistent, manageable configurations with Insight Version Control and Integration Server Maintenance. Version Control and Integration Server Maintenance allows the administrator to monitor and update versions of the server and workstation firmware, drivers, and utilities.
- Performance management/resource utilization helps determine how servers are utilized, and if upgrades or updates are necessary to increase overall system performance.
- Full integration witb Compaq Remote Insight Board/PCI and ProLiant Integrated Remote Console allows "in-band" and "out-of-band" connection for server management. This capability ensures tbat customers are in toucb with their systems, even when servers are offline or without power.
- Simple Network Management Protocol (SNMP) standards provide integration with other management products.
- Flexible network conductivity supports multiple transport protocols including IPX, TCP/IP, and PPP to operate over LANs, WANs, and modems.
- Support for the following leading operating systems:
  - Microsoft Windows NT
  - Novell NetWare, IntranetWare, and IntranetWare for Small Business
  - SCO UNIX, OpenServer, and UnixWare
  - IBM OS/2 Warp family of products

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- In Compaq servers, every hardware subsystem (such as disk storage, system memory, and system processor) has a robust set of management capabilities. Compaq Full-Spectrum Fault Management prevents faults before they happen, keeps the system up and running in the unlikely event of a failure, and delivers rapid server recovery to normal operation after a fault.

Compaq Insight Manager Software Architecture

The Compaq Insight Manager software architecture is typical of other network management solutions. It has a client/server architecture and is composed of agent software (Compaq Insight Management Agents) and the management application software (Compaq Insight Manager).

Insight Management Agents

Insight Management Agents operate on Compaq systems (such as servers and workstations), performing in-depth monitoring of the state of the system by collecting and measuring system parameters. These parameters indicate the current state of subsystems by counting the occurrence of particular events (for example, the number of read operations performed on a disk drive) or monitoring the state of a critical function (such as whether the cooling fan is operating).

Insight Desktop Agents operate on Compaq *Deskpro*™ computers, monitoring functions that include temperature sensing and disk prefailure alerting.

Insight Agents provide information to management applications, such as Compaq Insight Management, and can generate alarm notifications if significant changes occur in the fault or performance aspects of system operation. Information is delivered to and from the Insight Agents by the industry-standard SNMP.

Compaq Insight Manager

Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the Compaq hardware. In the unlikely event of hardware failures, Compaq Insight Manager also provides a full complement of remote maintenance and control facilities.

For additional information, refer to the online *Compaq Insight Manager User Guide* on the Server Documentation CD that accompanied the server.

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Chapter 4

Connectors, Switches, and LED Status Indicators

This chapter provides connector, switch, and LED status indicator information for the Compaq ProLiant ML570 server.

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Connectors

This section contains information about connectors located on the ProLiant ML570 server.

Rear Panel Connectors

Figure 4-1 shows the rear panel connectors for the ProLiant ML570 server. Table 4-1 shows the corresponding connector descriptions.

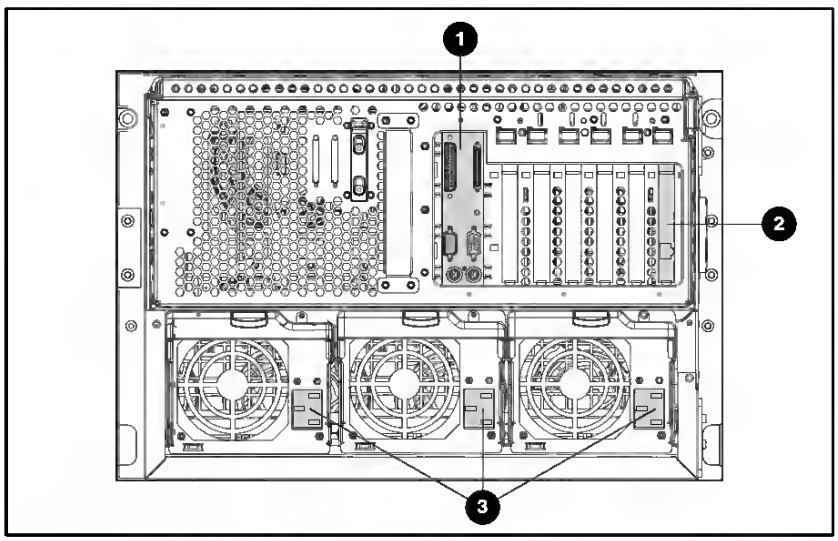

Figure 4-1. Rear panel connectors

Table 4-1
Rear Panel Connectors

Item	Connector
❶	Peripheral board rear connectors (See "Peripheral Board Connectors" later in this chapter.)
❷	Compaq NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL) Controller (RJ-45)
❸	AC power connectors

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System Board Connectors

Figure 4-2 shows the system board connectors for the ProLiant ML570 server. Table 4-2 shows the corresponding connector descriptions.

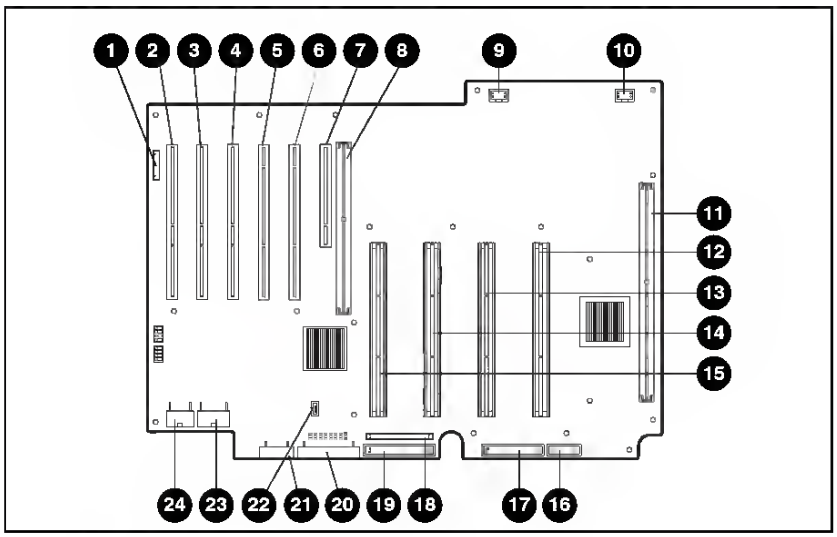

Figure 4-2. System board connectors

Table 4-2
System Board Connectors

Item	Connector	Item	Connector
❶	Hot-plug connector	⓭	Processor slot 2
❷	PCI slot, 33-MHz/64-bit (non-hot-pluggable)	⓮	Processor slot 3
❸	PCI slot, 33-MHz/64-bit	⓯	Processor slot 4
❹	PCI slot, 33-MHz/64-bit	⓰	CPU fan
❺	PCI slot, 66-MHz/64-bit	⓱	Diskette drive
❻	PCI slot, 66-MHz/64-bit	⓲	High density IDE drive (not used)
❼	PCI slot, 33-MHz/32-bit (non-hot-pluggable)	⓳	IDE CD-ROM drive
❽	Peripheral board slot (non-hot-pluggable)	⓴	Power supply backplane sense connector
❾	Not used	㉑	I/O fan
❿	Not used	㉒	Virtual power button connector for the Remote Insight Board (RIB)
⓫	Memory board slot	㉓	Power supply connection
⓬	Processor slot 1	㉔	Power supply connection

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Peripheral Board Connectors

Figure 4-3 shows the ProLiant ML570 server peripheral board connectors. Table 4-3 identifies the corresponding connectors.

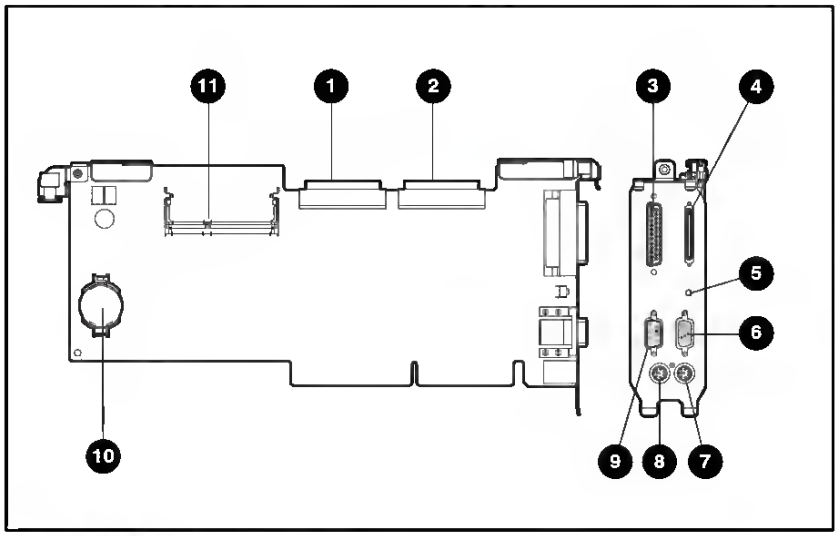

Figure 4-3. Peripheral board connectors

Table 4-3
Peripheral Board Connectors

Item	Description
❶	SCSI port 1 connector
❷	SCSI port 2 connector
❸	Parallel port connector
❹	VHDC SCSI connector
❺	NMI switch access (debugging only)
❻	Video connector
❼	Mouse connector
❽	Keyboard connector
❾	Serial connector
❿	Battery connector
⓫	Integrated Smart Array Controller connector

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Power Backplane Board Connectors

Figure 4-4 shows the ProLiant ML570 server power backplane board connectors. Table 4-4 identifies the corresponding connectors.

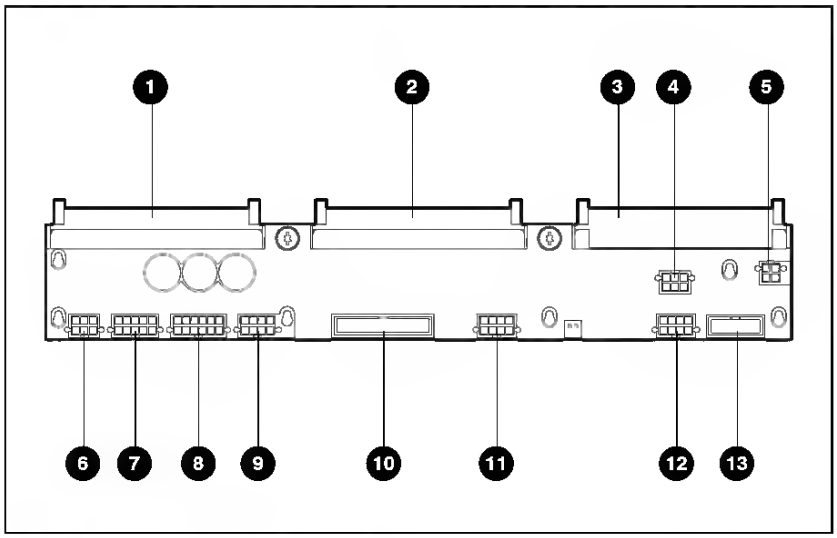

Figure 4-4. Power backplane board connectors

Table 4-4
Power Backplane Board Connectors

Item	Description
❶	Power supply connector
❷	Power supply connector
❸	Power supply connector
❹	SCSI power connector
❺	Power connector for diskette and CD-ROM drives
❻	SCSI media connector
❼	Power connector
❽	Power connector
❾	Fan 5 power connector
❿	Sense connector
⓫	Fan 6 power connector
⓬	Fan 7 power connector
⓭	Power On/Standby switch

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Switches

This section provides information about internal switches for the ProLiant ML570 server.

System Maintenance Switch Settings (SW1)

Figure 4-5 shows the system maintenance switchbank and the default settings for the ProLiant ML570 server. Table 4-5 describes the peripheral board switch settings.

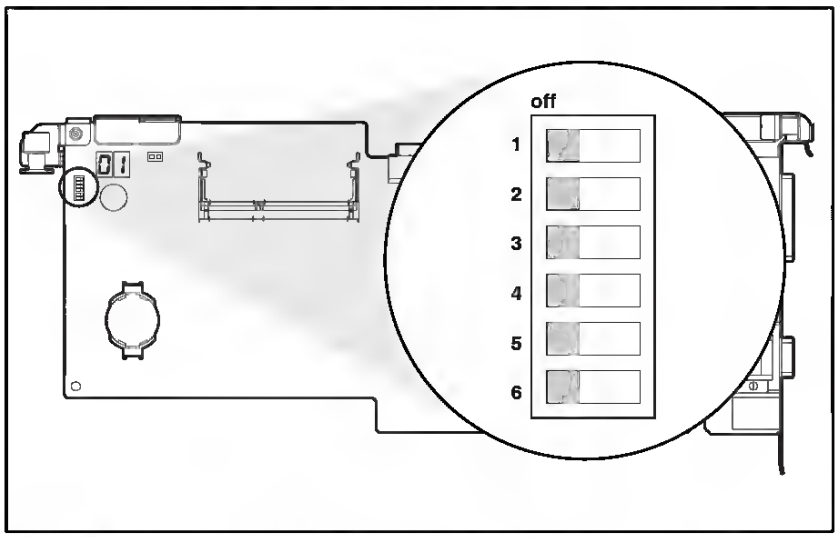

Figure 4-5. Peripheral board configuration (maintenance) switchbank (SW1) location and default settings

Table 4-5
Peripheral Board Configuration (Maintenance) Switchbank (SW1) Settings

Switch	Function	Open (OFF) Default Position	Closed (ON) Position
1	Video disable override	Onboard integrated video is enabled	Onboard integrated video is disabled
2	Lock configuration	Configuration unlocked and can be altered	Locks system configuration and cannot be altered
3	Tower-to-rack conversion	Tower configuration	Rack-mount configuration
4	Diskette boot feature	Diskette boot can be changed through system configuration utility	Diskette drive is enabled for booting, overriding the system configuration utility
5	Power on password	Power on password feature is enabled	Power on password feature is disabled
6	Maintenance	NVRAM is validated, configuration saved	NVRAM is invalidated; configuration erased

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Clearing CMOS

To erase an invalid system configuration:

1. Move the S6 configuration switch (SW1) to the On position. This setting clears portions of CMOS and NVRAM.
2. Power up the server. Wait for the ProLiant logo to display on the video display.
3. Power down the server.
4. Move the S6 configuration switch to the Off position.
5. Power up the server. Refer to the *Compaq ProLiant ML570 Server Troubleshooting Guide* for more information.

To clear all contents of CMOS NVRAM, remove the battery, then reinstall the battery. All device settings have to be completely reconfigured. See Figure 4-5 for the configuration switchbank location and Table 4-5 for the configuration settings.

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Processor Configuration Switch (SW4) and System ID Switch (SW6)

CAUTION: The system ROM determines proper processor speeds. This section shows only the location of the switches and the default settings of each. These default settings must be set exactly as shown for proper operation of the ROM.

Figure 4-6 shows the default settings of the processor core frequency switch that support 750-MHz processors. Table 4-6 lists the processor core frequency switch settings for the ProLiant ML570 server with processor speeds ranging from 700- to 900-MHz.

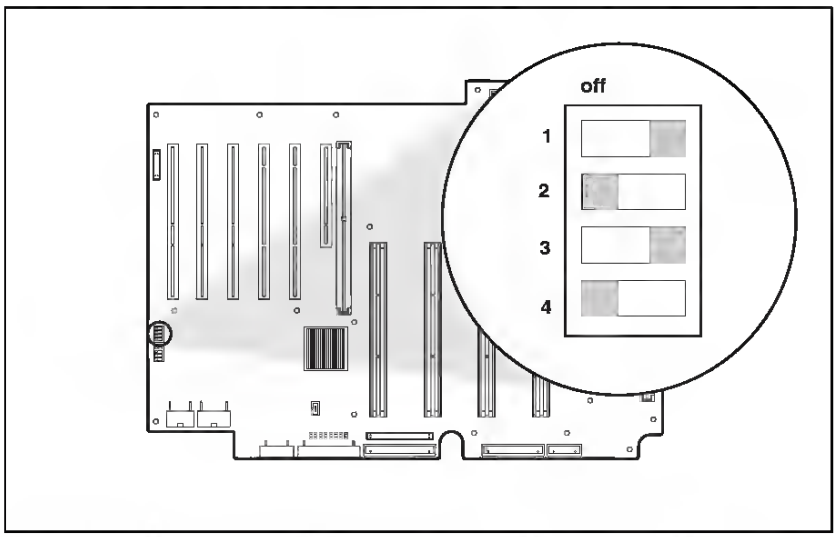

Figure 4-6. Location and default setting for core frequency switch (SW4) supporting 700-MHz processors (example)

Table 4-6
Processor Configuration Switch (SW4) 100-MHz Bus Speed

Position	Function	Processor Core Speed Settings 700-MHz
1	Sets system bus to processor core frequency ratio	On
2		Off
3		On
4		Off

Note: Compaq makes no representation or warranty that processors operating at any of the speeds shown are available at any time. Therefore, processor core speeds shown are not necessarily representative of future processors.

Note: For processors 850-MHz or higher, it is not necessary to change switch settings

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System Board ID/Miscellaneous Switch (SW6)

Figure 4-7 shows the location of the system board ID/miscellaneous switch (SW6). Switches 3 and 4 are used for system chassis identification. Switch 1 is used to control booting from a spare processor. Switch 2 is used to disable the system board interlocks. Table 4-7 identifies the functions and settings of each switch.

CAUTION: These settings are factory-set and do not need to be adjusted. They are only shown here for identification and diagnostics. Refer to the *Compaq ProLiant ML570 Troubleshooting Guide* for additional information.

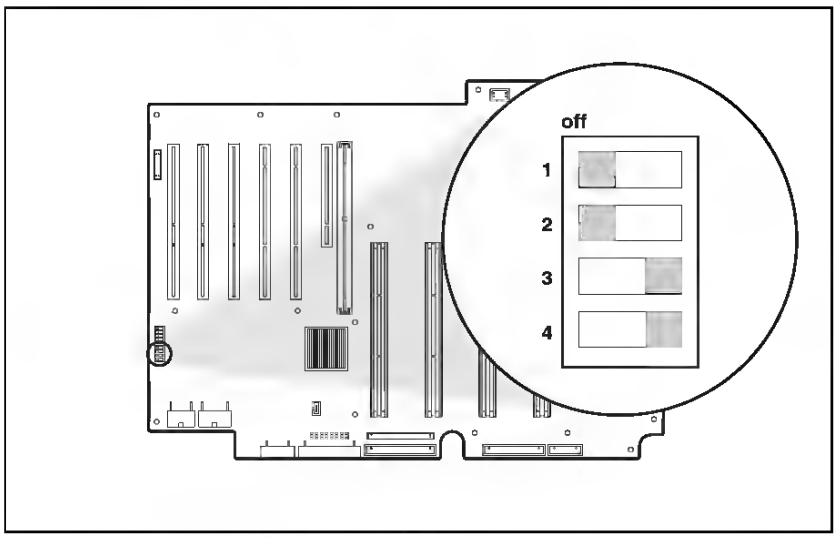

Figure 4-7. System board ID/miscellaneous switch (SW6)

Table 4-7
System Board ID/Miscellaneous Switches (SW6)

Switch	Function	Settings
1	Hot spare boot enable	Off = Enables hot spare boot
		On = Disable hot spare boot
2	Interlock enable	Off = Interlock enabled
		On = Interlock disabled
3	System chassis ID	On = ProLiant ML570 server chassis
4	System chassis ID	On = ProLiant ML570 server chassis

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LED Status Indicators

This section contains information on service LED indicators located on the ProLiant ML570 server. LED indicators covered in this section include:

- Power Switch and Front Panel LED Indicators
- Hot-Plug Fan LED Indicators
- Interlock Status LED Indicators
- Internal Diagnostics Display
- PCI Hot Plug Switchboard LED Indicators
- RJ-45 Network Connector Status LED Indicators
- Hot-Plug Power Supply Diagnostic LED Indicators
- CD-ROM Drive LED Indicator
- Diskette Drive LED Indicator
- Hot-Plug Hard Drive LED Indicators

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Power Switch and Front Panel LED Indicators

The front panel Power On/Standby switch is embedded with four LED indicators. Figure 4-8 shows the location of the LED indicators on the front panel. Table 4-8 identifies each LED and describes conditions for all of the LED indicator modes.

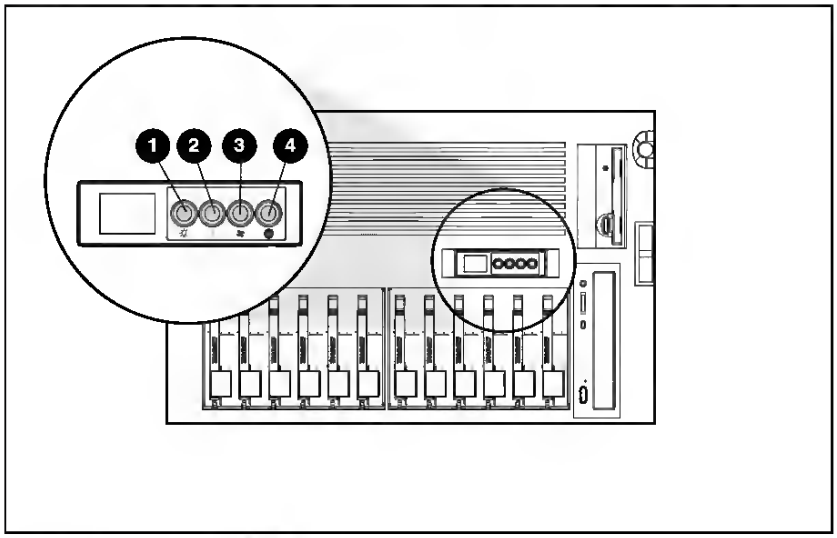

Figure 4-8. Front panel LED indicators

Table 4-8
Front Panel Status LED Indicators

Item	Description	Status	Condition
❶	Power LED	Green	System power on
		Amber	System power in standby
		Amber (flashing)	Temporary shutdown (15 seconds) due to thermal event
		Off	System power off
❷	Memory	Green	All memory modules (DIMMs) and processors operational
		Amber (flashing)	One or more DIMMs or processors have failed— check the Internal Diagnostics Display (IDD). See "Internal Diagnostics Display" later in this section.
❸	Fans	Green	All fans operational
		Amber (flashing)	One or more fans have failed— check fan LED indicators. See "Hot-Plug Fan LED Indicators" later in this section.
❹	Power Supplies	Green	All power supplies operational
		Amber (flashing)	One or more power supplies have failed— check power supply LED indicators. See Table 4-14 "Hot-Plug Power Supply Diagnostic LED Indicators" later in this section.

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Hot-Plug Fan LED Indicators

Hot-plug fan LED indicators show the condition of each fan in the ProLiant ML570 server. If the front panel main fan LED indicator is amber, check the individual fan diagnostic LED indicator to determine which fan has failed.

To view the hot-plug fan diagnostic LED indicators, remove the access panel of the server. See "Access Panel (Tower and Rack)" in Chapter 2. Figure 4-9 shows the location of the hot-plug fan diagnostic LED indicators. Table 4-9 identifies the diagnostic LED indicators and describes the condition of the fan.

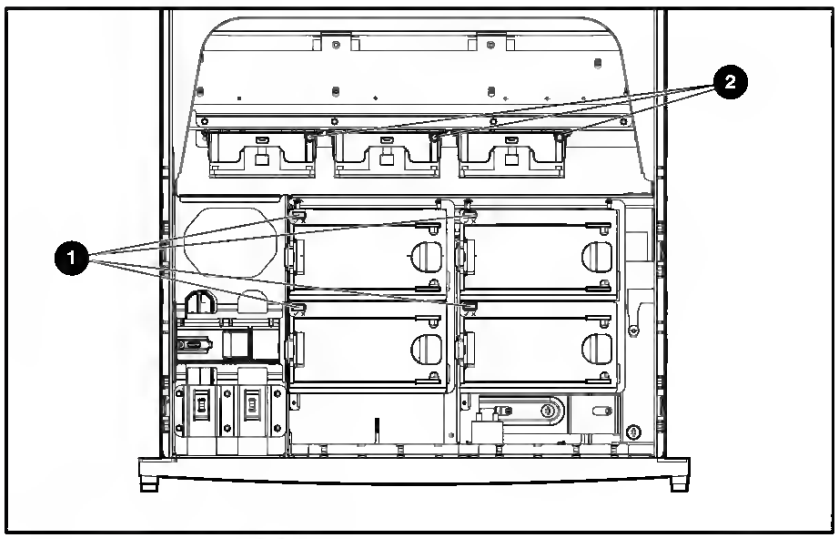

Figure 4-9. Hot-plug fan LED indicators

Table 4-9
Hot-Plug Fan Diagnostic LED Indicators

Item	Description	Status	Condition
❶	System fans	Green	Fan is operational
		Amber	Fan failure
		Off	No power to fan
❷	Drive fans	Green	Fan is operational
		Amber	Fan failure
		Off	No power to fan

Note: Fans may continue to spin after temporary failure occurs. Replace failed fans (amber LED indicator) even if spinning continues.

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Interlock Status LED Indicators

Improperly seated components in the interlock chain cause the LED associated with the fault origination point to illuminate on the system board. Figure 4-10 shows the location of the interlock LED indicators and Table 4-10 identifies the point of the hardware connection fault.

IMPORTANT: This server is not equipped with chassis door or access panel interlocks.

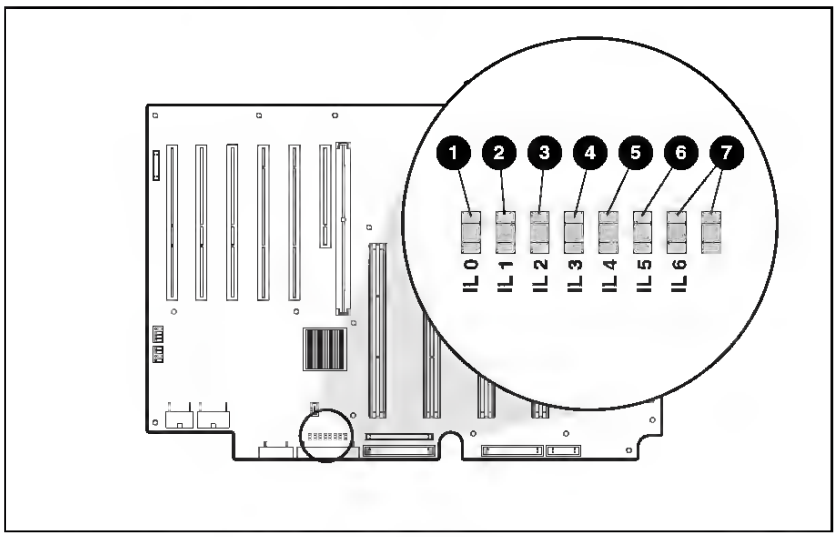

Figure 4-10. Interlock LED indicators on system board

Table 4-10
System Board Interlock LED Indicators

Fault of Interlock Error	❶	❷	❸	❹	❺	❻	❼
Memory board	On	On	On	On	On	On	On
Processor 1	Off	On	On	On	On	On	On
Processor 2	Off	Off	On	On	On	On	On
Processor 3	Off	Off	Off	On	On	On	On
Processor 4	Off	Off	Off	Off	On	On	On
Peripheral board	Off	Off	Off	Off	Off	On	On
P/S backplane board	Off	Off	Off	Off	Off	Off	On
No interlock error	Off	Off	Off	Off	Off	Off	Off

Note: Only the left LED indicator in any row can provide a valid indication of error. After ensuring that the server is powered down and the power cables are disconnected from all the power supplies, reseat the device associated with the left LED.

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Internal Diagnostics Display

Figure 4-11 shows the location of the Internal Diagnostics Display (IDD). The IDD provides alphanumerical codes that assist the technician in determining trouble conditions. Table 4-11 lists diagnostic codes that identify processor or memory trouble conditions. Refer to the *Compaq ProLiant ML570 Troubleshooting Guide* for more information.

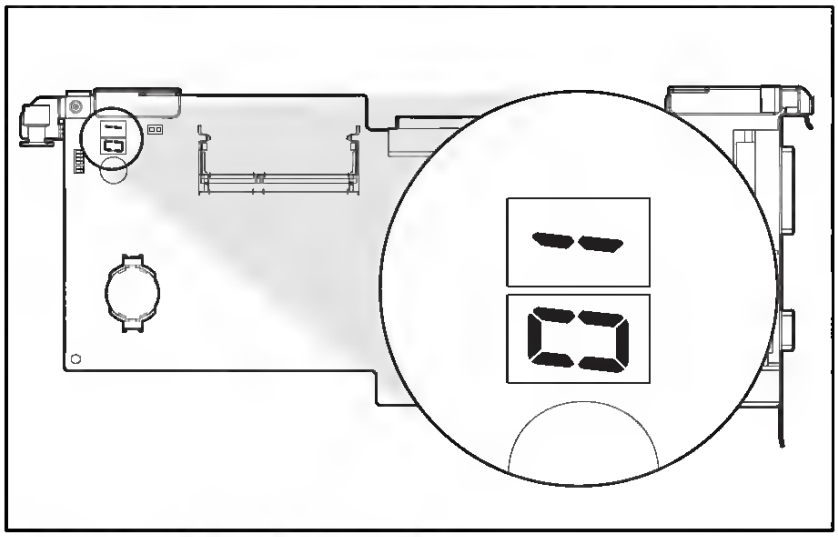

Figure 4-11. Internal Diagnostics Display (IDD) indicator

Table 4-11
Internal Diagnostics Display (IDD) Indicator Codes

Error Code	Description	Error Code	Description
P1	Processor 1	07	DIMM 7
P2	Processor 2	08	DIMM 8
P3	Processor 3	09	DIMM 9
P4	Processor 4	10	DIMM 10
01	DIMM 1	11	DIMM 11
02	DIMM 2	12	DIMM 12
03	DIMM 3	13	DIMM 13
04	DIMM 4	14	DIMM 14
05	DIMM 5	15	DIMM 15
06	DIMM 6	16	DIMM 16

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PCI Hot Plug Switchboard LED Indicators

LED indicators on the PCI Hot Plug switchboard provide information about the condition of the expansion board. Figure 4-12 shows the PCI Hot Plug button LED indicators. Table 4-12 identifies the location of the hot-plug power supply LED indicators and the corresponding LED indicator status descriptions.

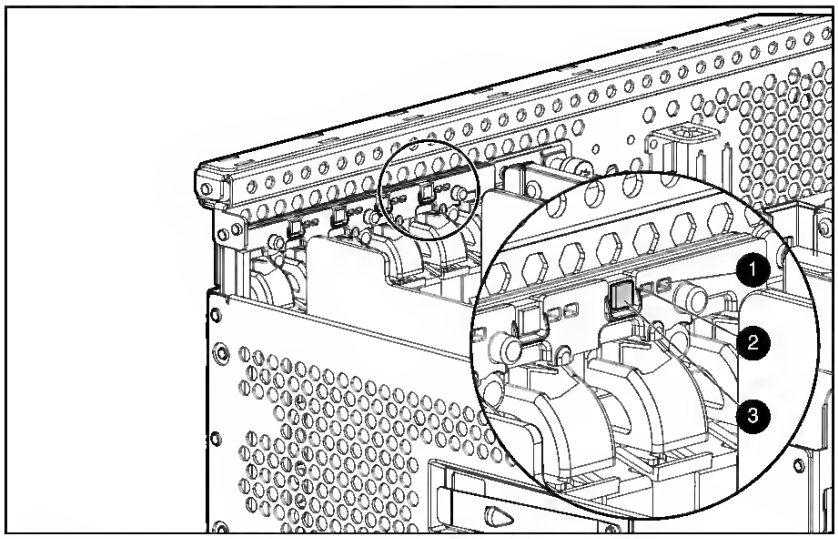

Figure 4-12. PCI Hot Plug button LED indicators (❶ and ❷), and button (❸) under the PCI Hot Plug access door

The PCI Hot Plug switchboard LED indicators at each expansion slot provide a visual status of each board slot. The LED indicators are viewed from the rear of the server or by opening the PCI Hot Plug access door on the top access panel.

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Table 4-12
PCI Hot Plug LED Indicators

LED Condition	Power Status	OK to Open	Slot Status
❶ Green ❷ Amber	On Off	No	Power is currently applied to the slot. Do NOT open the slot release lever. The slot is functioning normally.
❶ Green ❷ Amber	On On	No	Power is currently applied to this slot but the slot needs ATTENTION for possible problem with the slot, board, or driver. Do NOT open the slot release lever. Follow these steps: 1. Through the PCI Hot Plug application, turn power Off to the slot (the green LED turns Off). 2. Open the slot release lever (the amber LED turns Off). 3. Remove or replace the board. 4. Connect the cables to the PCI board. 5. Close the slot release lever. 6. Return power to the slot through the PCI Hot Plug application (the green LED turns On).
❶ Green ❷ Amber	Flashing On	No	Power slot is being turned Off or On, which may take several minutes. There may be a problem with the slot, the PCI board, or the driver. Do NOT open the slot release lever until the green LED is completely Off.
❶ Green ❷ Amber	Off On	No	Power to this slot is turned Off but this slot needs ATTENTION. There may be a problem with the slot, board, or driver. 1. Open the slot release lever (the amber LED turns Off). 2. Remove or replace the board. 3. Connect the cables to the PCI board. 4. Close the slot release lever. 5. Return power to the slot through the PCI Hot Plug application (the green LED turns On)
❶ Green ❷ Amber	Off Off	Yes	The power to the slot is Off. If you need to replace the board in this slot, follow these steps: 1. Open the slot release lever. 2. Remove or replace the board. 3. Connect the cables to the PCI board. 4. Close the slot release lever. 5. Return power to the slot through the PCI Hot Plug application (the green LED turns On)

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RJ-45 Network Connector Status LED Indicators

Two RJ-45 network connector LED indicators are located on the rear of the ProLiant ML570 server. These LED indicators show the network connection condition of the server. Figure 4-13 shows the location of the RJ-45 network connector LED indicators and Table 4-13 identifies the status and conditions of both LED indicators.

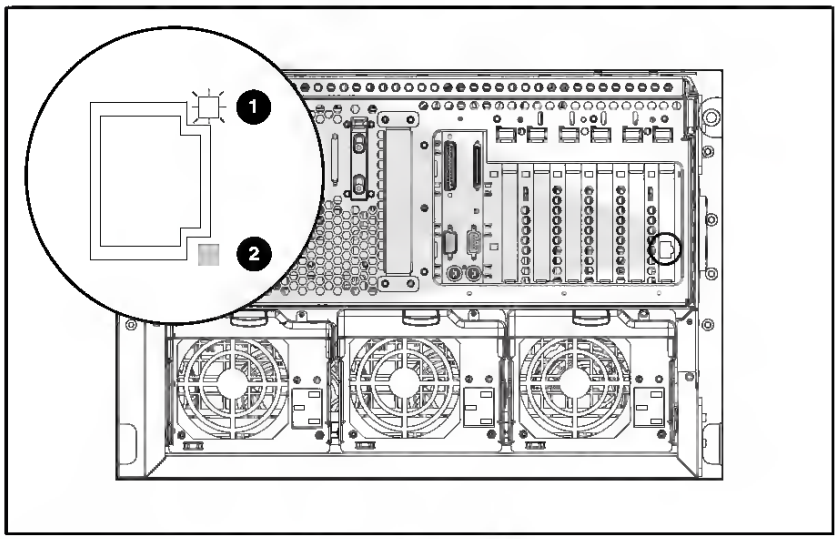

Figure 4-13. RJ-45 network connector LED indicators location

Table 4-13
RJ-45 Network Connector Status LED Indicators

Item	Description	Status	Condition
❶	Link	On	Linked to network
		Off	No network link
❷	Activity	On or flashing	Network activity present
		Off	No network activity

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Hot-Plug Power Supply Diagnostic LED Indicators

The hot-plug power supply diagnostic LED indicators show the condition of each hot-plug power supply. If the front panel power supply LED indicator is amber, check the individual power supply diagnostic LED indicator to determine which power supply has failed. View the diagnostic LED indicator from the rear of the server.

Figure 4-14 shows the power supply diagnostic LED indicators and their functions for the ProLiant ML570 server. Table 4-14 identifies the functions of the hot-plug power supply. To replace a hot-plug power supply, see "Hot-Plug Power Supplies" in Chapter 2. The status and diagnostic LED indicator color resets when the power supply is replaced or when AC power is restored to the power supply.

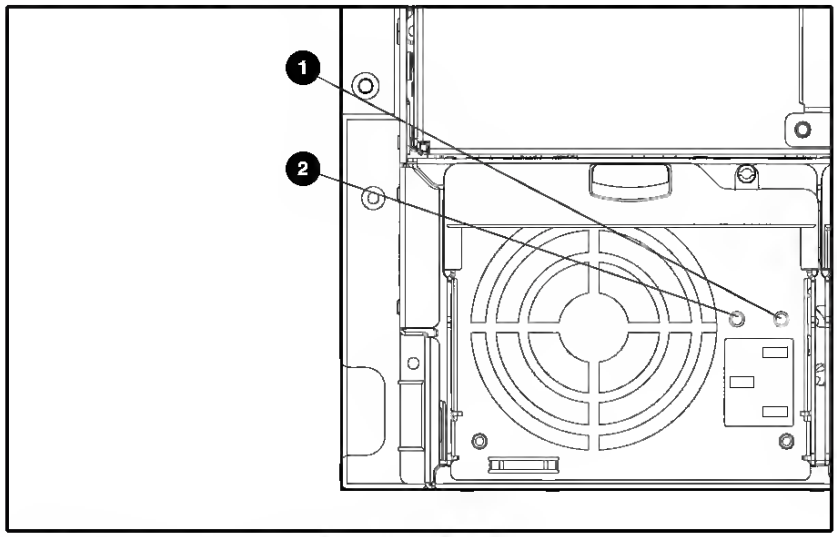

Figure 4-14. Hot-plug power supply diagnostic LED indicators

Table 4-14
Hot-Plug Power Supply Diagnostic LED Indicators

Item	Description	Status	Condition
1	AC power	On	System is On
	(Green)	Flashing	System is in standby
		Off	No AC power present
2	Error	Off	Power supply is operational (OK)
	(Amber)	On	Power supply failure— replace power supply
		All On	No AC power present to any power supply
		Flashing	Electric current limit exceeded (overload)

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CD-ROM Drive LED Indicator

The CD-ROM drive LED indicator ❶ is located on the front of the CD-ROM drive near the volume wheel. The LED indicator illuminates green whenever the CD-ROM drive is in operation. Figure 4-15 shows the CD-ROM drive LED indicator for the ProLiant ML570 server.

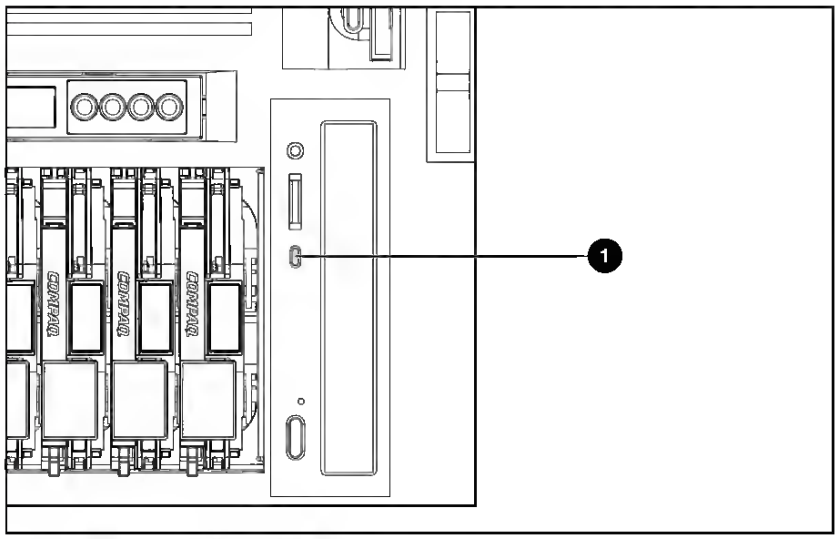

Figure 4-15. CD-ROM drive LED indicator

Diskette Drive LED Indicator

Figure 4-16 shows the location of the diskette drive LED indicator ❶. The LED indicator illuminates green when the diskette drive is in operation. Table 4-16 shows the diskette drive LED indicator on the ProLiant ML570 server.

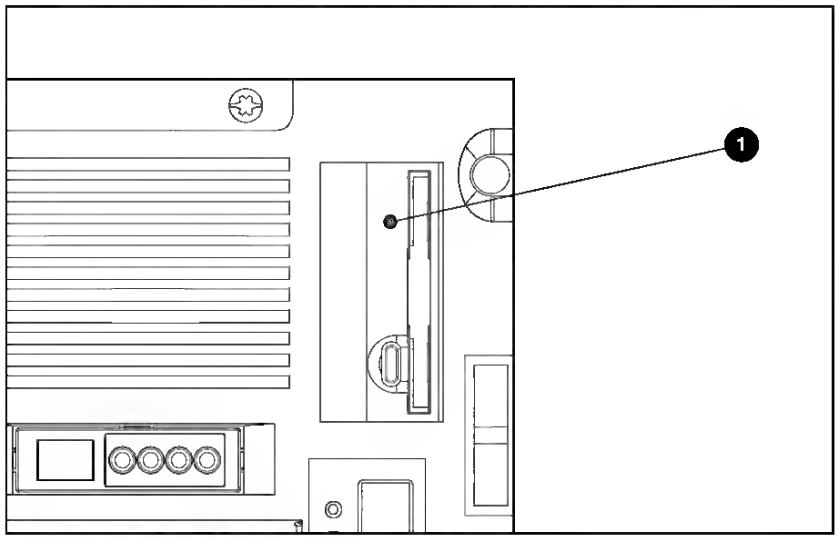

Figure 4-16. Diskette drive LED indicator

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Hot-Plug Hard Drive LED Indicators

Each hot-plug hard drive has LED indicators that show the operational status of the hard drive. Figure 4-17 and Table 4-15 show the location, function, and replacement condition for each hot-plug hard drive LED indicator for the ProLiant ML570 server.

CAUTIDN: Replace a hard drive only when the hard drive LED indicator is amber. Do not remove a hot-plug drive if the online LED indicator is green.

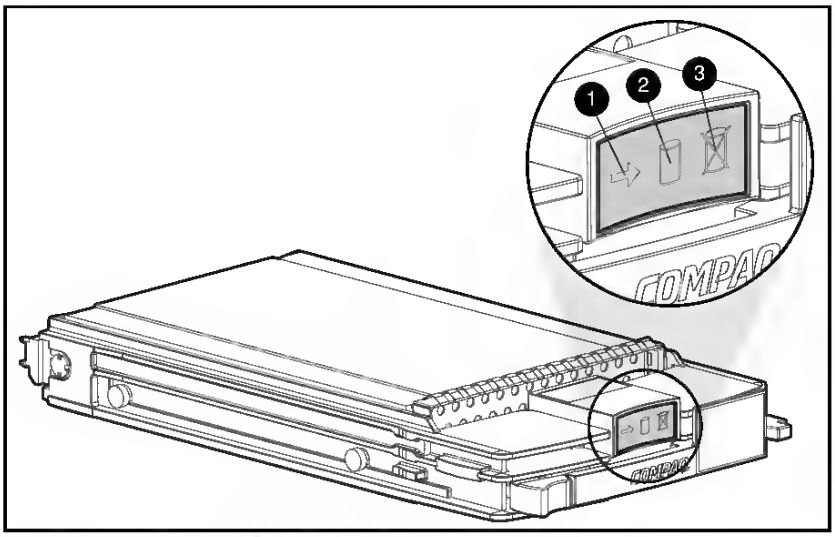

Figure 4-17. Hot-plug hard drive LED indicators

Table 4-15
Hot-Plug SCSI Hard Drive LED Indicators

Drive Activity LED ❶	Drive Dnline LED ❷	Drive Fault LED ❸	Condition
Off	Off	Off	The drive is off. OK to remove drive.
Off	Off	Amber	Failed drive. Replace hot-plug SCSI hard drive
Off	Green	Off	Drive is online and configured as part of an array. OK to replace the drive if a predictive failure alert is received.
Green	Green	Off	Drive is online and being accessed. OK to replace the drive if a predictive failure alert is received.
Green	Off	Off	Drive is being accessed. **DD NDT** remove drive.
Green	Flashing green	Off	Drive is being rebuilt. **DD NDT** remove drive.
Flashing green	Flashing green	Flashing amber	Drive is being identified by the Array Configuration Utility. **DD NDT** remove drive.

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Chapter 5

Physical and Operating Specifications

This chapter provides specifications for the Compaq ProLiant ML570 server. It includes the following information:

- System Unit
- Hot-Plug Power Supply
- SDRAM Dual Inline Memory Modules
- 1.44-MB Diskette Drive
- IDE CD-ROM Drive
- NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL)
- Integrated Dual-Channel Wide Ultra2 SCSI Controller
- Hot-Plug Hard Drives
- Smart Array 4200 Controller

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System Unit

Table 5-1
System Unit Specifications

Dimensions	
Height	50.8 cm (20.0 inch)
Width	32.5 cm (12.8 inch)
Depth	67.3 cm (26.5 inch)
Weight	45 kg, minimum (100 lb, minimum)
International input requirements	
Rated input voltage	200 to 240 V
Rated input frequency	47 to 63 Hz
Rated input current	3.8 A
U.S. input requirements	
Rated input voltage	100 to 127 V
Rated input frequency	47 to 63 Hz
Rated input current	7.6 A
Power supply output power	
Rated steady-state power	450 W
Maximum peak power	750 W
Temperature range	
Operating	10° to 35°C (50° to 95°F)
Nonoperating	-30° to 60°C (-20° to 140°F)
Relative humidity (noncondensing)	
Operating	20% to 80%
Nonoperating	5% to 90%
Maximum wet bulb temperature	38.7°C (101.7°F)
Heat dissipation	2400 BTU/h

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Hot-Plug Power Supply

Table 5-2
Hot-Plug Power Supply Specifications

International input specifications	
Nominal line voltage	200 to 240 VAC
Range input line	180 to 270 VAC
Frequency range	47 to 63 Hz
Power factor	0.95
Input current	3.8 A at 200 VAC
Inrush current (cold start)	<150 A at 132 VAC
Holdup time	20 ms from zero crossing at 240 VAC
U.S. input specifications	
Nominal line voltage	100 to 120 VAC
Range input line	90 to 132 VAC
Frequency range	47 to 63 Hz
Power factor	0.95
Input current	7.6 A at 100 VAC
Inrush current (cold start)	<150 A at 132 VAC
Holdup time	20 ms from zero crossing at 120 VAC
General specifications	
Full output rating	To 40°C and 1,524 m (To 104°F and 5,000 ft)
	To 32°C and 3,048 m (To 90°F and 10,000 ft) derate linearly
Minimum load	1.0 A on + 5 V output
	1.0 A on + 12 V output
	0.5 A on + 3.3 V output
Ambient temperature range	
Operating	10° to 40°C (50° to 104°F)
Nonoperating	-40° to 65°C (-40° to 149°F)
Dielectric voltage withstand	
Input to output	3000 VAC (minimum)
Input to ground	1500 VAC (minimum)
Common and differential mode (superimposed on AC line)	2500V, 1 μs, damped sinusoid 600V, 10 μs pulse 20% step change in AC input voltage

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SDRAM Dual Inline Memory Modules (DIMMs)

CAUTION: Use only SDRAM DIMMs of the same size, speed, and manufacturer. SDRAM DIMMs from other sources may adversely affect data integrity. Power-On Self-Test (POST) warns of nonsupported SDRAM DIMMs.

Table 5-3
SDRAM DIMM Specifications

Size	128-, 256-, 512-MB, and 1-GB
Speed	CL-2, CL-3
Upgrade requirement	Bank of four identical DIMMs installed or removed at a time

Note: Use only 128-, 256-, 512-MB, or 1-GB registered, 72-bit wide, 3.3-volt, ECC SDRAM. SDRAM must be 100-MHz or faster. Use Compaq SDRAM only.

1.44-MB Diskette Drive

Table 5-4
1.44-MB Diskette Drive Specifications

Size	3.5 inch
LED indicator (front panel)	Green
Read/write capacity per diskette (high/low density)	1.44-MB/720-KB
Drives supported	1
Drive height	1/3
Drive rotation	300 rpm
Transfer rate bits/sec (high/low)	500-KB/250-KB
Bytes per sector	512
Sectors/Track (high/low)	18/9
Tracks/Side (high/low)	80/80
Access times	
Track-to-track (high/low)	3 ms/6 ms
Average (high/low)	169 ms/94 ms
Settling time	15 ms
Latency average	100 ms
Cylinders (high/low)	80/80
Read/write heads	2

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IDE CD-ROM Drive

Table 5-5
32X Max IDE CD-ROM Drive Specifications

Dimensions	
Height	4.29 cm (1.9 inch)
Width	15 cm (5.9 inch)
Depth	20.8 cm (8.1 inch)
Weight	950 g (2.1 lb)
Capacity	
Mode 1	2,048 bytes
Mode 2	2,340; 2,336; 1,024 bytes
CD-DA	2,352 bytes
CD-XA	2,328 bytes
Data transfer rate	
Sustained	150 KBps
Burst	2100 to 4800 KBps
Access times	
Full stroke	100 ms
Random	150 ms
Cache buffer	128 KBps
Startup time (typical)	<7 s
Stop time	<4 s
Laser parameters	
Type	Semiconductor Laser GaA1As
Wavelength	780 +/- 25 nm
Divergence angle	53.5 +/- 1.5 degrees
Output power	0.14 mW
Audio interface, line out	0.7 VRMS @ 47 kΩ
Digital audio out connector	0.6 VRMS @ 32 Ohms

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NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL)

Table 5-6
NC3123 Fast Ethernet NIC PCI 10/100 Wake on LAN (WOL) Specifications

Network interface	10 Base-T/100 Base-TX networks
Capability	IEEE 802.2, 802.3, 802.3u
Data transfer method	32-bit/33-MHz bus mastering
Network transfer rate	
10 Base-T (half-duplex) 10 Base-2	10 Mbps
10 Base-T (full-duplex)	20 Mbps
100 Base-TX (half-duplex)	100 Mbps
100 Base-TX (full-duplex)	200 Mbps
Connector	RJ-45
I/O address and interrupt	Automatic configuration
Cable support	
10 Base-TX	Categories 3, 4, or 5 UTP (2 or 4 pair), up to 100 meters (328 feet)
100 Base-TX	Category 5 UTP (2 pair)
OS driver support	Novell NetWare Server v 3.x, 4.x, and 5 x; NetWare DOS Client; Microsoft Windows NT 3.51 and 4.0; OS/2 Warp Server; SCO Open Server 5.x and UnixWare v 7.x, SCO 2.1; Microsoft Windows 95, 98, 2000; MS DOS Client;
Power and environmental specifications	
Operating temperature	10° to 55° C (50° to 131° F)
Humidity	Up to 85° (noncondensing)
Nonoperating temperature	10° to 55° C (-4° to 149° F)
Humidity (nonoperating temperature)	Up to 85° (noncondensing)
Power requirements	212 mA @ +5V DC, 1.06 Watts
Emissions standard	FCC Class B
Safety compliance	CE Mark

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Integrated Dual-Channel Wide Ultra2 SCSI Controller

Table 5-7
Integrated Dual-Channel Wide Ultra2 SCSI Controller Specifications

Drives supported	Up to 12 Wide Ultra2 devices per channel
Data transfer method	32-bit, 33-MHz PCI
SCSI channel transfer rate per channel	80 MBps
Maximum transfer rate per PCI bus	133 MBps
SCSI termination	Active termination
SCSI connectors	
Channel A	1 internal
Channel B	1 internal

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Hot-Plug Hard Drives

Table 5-8
Hot-Plug Hard Drive Specifications

	9.1 GB	9.1 GB	9.1 GB	18.2 GB	18.2 GB	18.2 GB
Rotational speed (rpm)	7,200	10,000	10,000	7,200	10,000	10,000
Logical capacity (MB)	9,100	9,100	9,100	18,209	18,209	18,210
Height						
Centimeters	2.5	2.5	2.5	2.5	2.5	2.5
Inches	1.0	1.0	1.0	1.0	1.0	1.0
Width						
Centimeters	8.9	8.9	8.9	8.9	8.9	8.9
Inches	3.5	3.5	3.5	3.5	3.5	3.5
Interface	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra3 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra3 SCSI
Transfer rate synchronous (max)	80 MBps	80 MBps	40 MBps	80 MBps	80 MBps	40 MBps
Seek time						
Single track	0.8 ms	0.8 ms	0.8 ms	0.8 ms	0.8 ms	0.8 ms
Average	7.9 ms	5.4 ms	5.4 ms	6.9 ms	5.7 ms	5.7 ms
Full stroke	17.0 ms	12.2 ms	12.2 ms	15.0 ms	12.2 ms	12.2 ms
Physical configuration						
Bytes	512	512	512	512	512	512
Logical blocks (in millions)	17.8	17.8	17.8	35.6	35.6	35.6
Operating temperature						
Fahrenheit	50º to 95º	50º to 95º	50º to 95º	50º to 95º	50º to 95º	50º to 95º
Celsius	10º to 35º	10º to 35º	10º to 35º	10º to 35º	10º to 35º	10º to 35º

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Smart Array 4200 Controller

Table 5-9
Smart Array 4200 Controller Specifications

Item	Description
Dimensions	
Height	13.7 cm (5.4 inch)
Length	12.4 cm (31.5 inch)
Thickness (including array accelerator)	2.5 cm (1 inch)
Temperature range	
Operating	10° to 35° (50° to 95°F)
Nonoperating	-30° to 60°C (-22° to 140°F)
Relative humidity (noncondensing)	20% to 80%
Operating	5% to 90%
Nonoperating	5% to 90%
Power required	+3.3V/300 mA
	+5V/3.0 A
	+12V/60 mA
	-12V/0 mA
Heat dissipated (maximum)	16.7 W
Maximum drives supported	18
Logical drives supported	32
Simultaneous drive transfer channels	2
Data transfer method	32-bit PCI bus master
Total transfer rate	320 MBps
SCSI electric interface	Low-voltage differential (LVD) and single-ended
PCI bus transfer rate (maximum)	133 MBps
SCSI port connectors	PCI 64D extended SCSI connector

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